

STUDIES OF THE UPPER ATMOSPHERE

A thesis presented for the
degree of Doctor of Philosophy in Physics
in the University of Canterbury,
Christchurch, New Zealand.

by

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1965

VOLUME 2.

TABLES

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TABLE B.1.

ADOPTED DEFINITIONS (IN VOLTS) OF BINARY DIGITS.

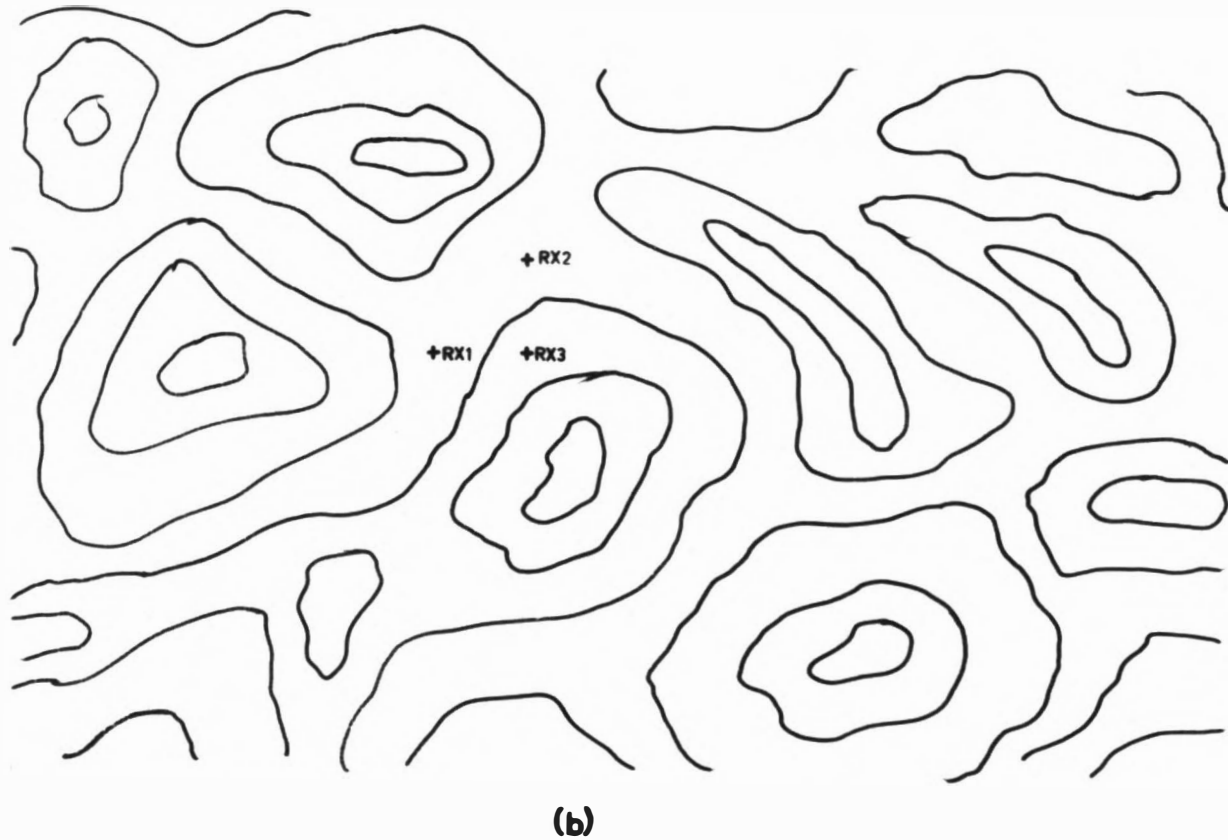
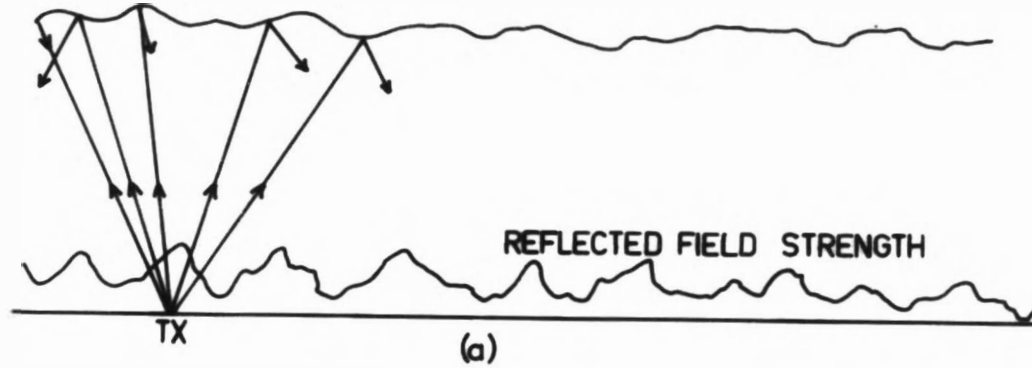
	CIRCUIT ELEMENT	BIT	MIN.	NOM.	MAX.
1	Transistor (level logic)	0	-0.25	0	0
2	" " "	1	-12	-12	-6
3	Electromechanical (level logic)	0	-0.25	0	0
4	" " "	1	-60	-48	-40
5	Transistor (pulse logic)	1 (=pos.step)	+6	+12	+12
6	Electromechanical and valve (pulse logic)	1 (=pos.step)	+24	+48	+60

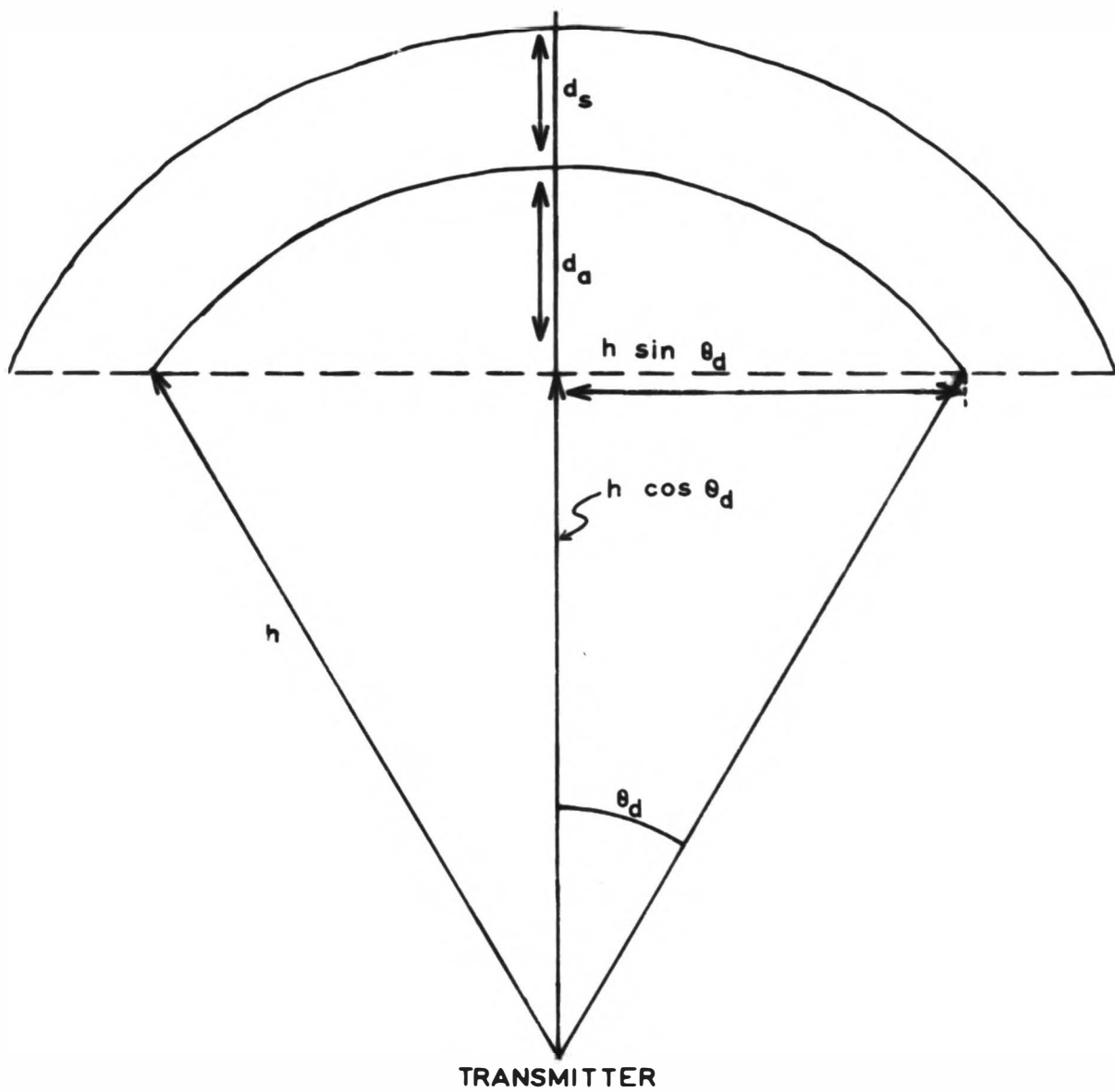
TABLE B.2.

SUMMARY OF TRANSISTOR PARAMETERS.(Grounded emitter operations. Ambient temp. = 40°C , $I_c = 50\text{mA}$)

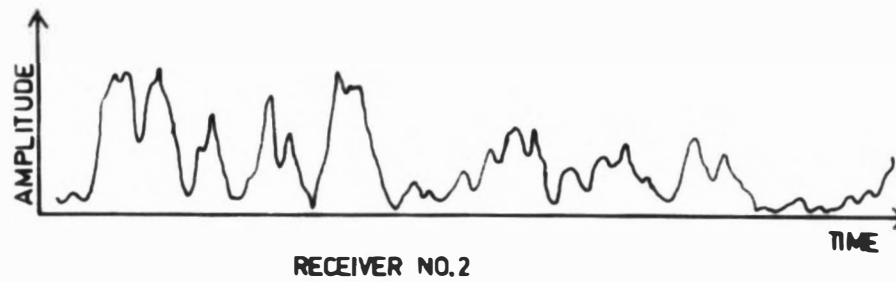
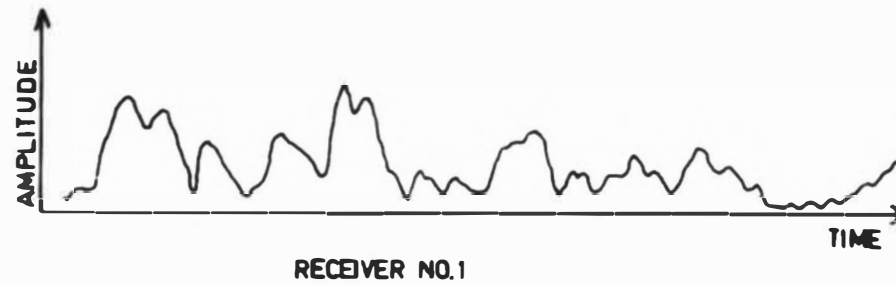
PARAMETER	ACY17	ACY20	ACY21		ASZ16	
$V_{CE} \text{ max } (V_{BE} \text{ iV})$	-60	-32	-32	V	-60	V
$V_{BE} \text{ max (reverse)}$	+12	+12	+12	V	+20	V
$V_{CE} \text{ (SAT) min}$	$\begin{matrix} 500 \\ (I_c = 300\text{mA}) \end{matrix}$	-200	-200	mV	$-1.0(I_c = 6\text{A})$	V
$V_{BE} \text{ (ON) min}$	$\begin{matrix} -750 \\ (I_c = 300\text{mA}) \end{matrix}$	-380	-380	mV	-800	mV
$V_{BE} \text{ (ON) max}$	$\begin{matrix} -315 \\ (I_c = 300\text{mA}) \end{matrix}$	-230	-230	mV	-400	mV
$V_{BE} \text{ (OFF) max}$	+200	+200	+200	mV	+500	mV
$V_{BE} \text{ (OFF) min}$	-100	-100	-100	mV	-300	mV
$I_c \text{ (AV) max}$	500	500	500	mA	8	A
$I_b \text{ (AV) max}$	25	25	25	mA	1	A
$I_{cc} \text{ max}$	16	16	16	μA	3.5	mA
$P_c \text{ max}$	180	180	180	mW	30	W
h_{FE}	50 - 210	50 - 130	90 - 250		45-130 ($I_c = 1\text{A}$)	
$f_1 \approx f_a$	1.1 (f_1)	1.1 (f_1)	1.1 (f_1)	Mc/s	0.25 (f_a)	Mc/s
τ_s	3.5	3.5	3.5	μs	50	μs

2.1 PRINCIPLES OF SPACED RECEIVER METHOD OF MEASURING IONOSPHERIC DRIFTS

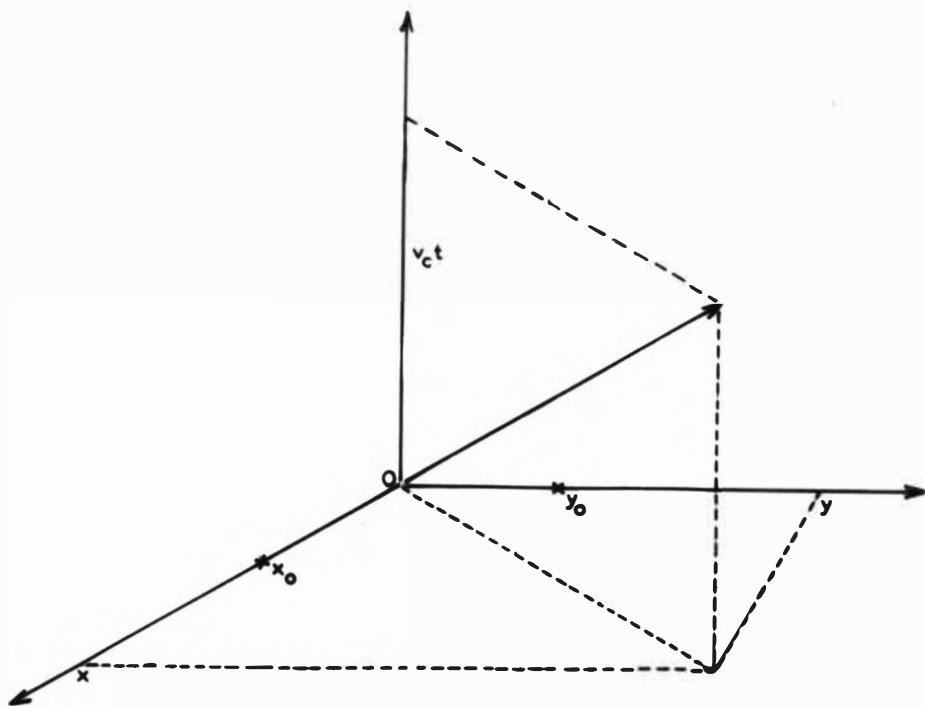




2.2 REFLECTION OF SPHERICAL WAVES FROM A PLANE REFLECTOR

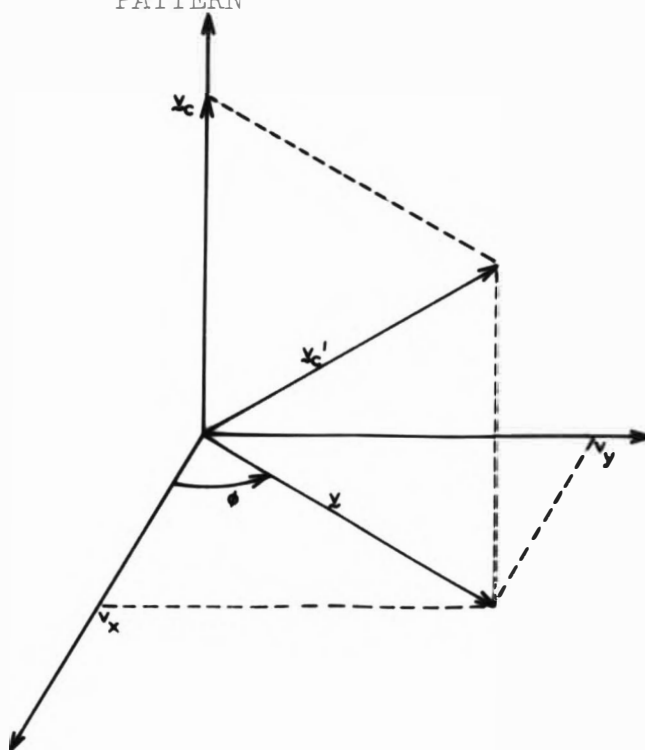


3.1 FADING RECORD FROM A PAIR OF RECEIVERS WITH INCOHERENT DETECTORS

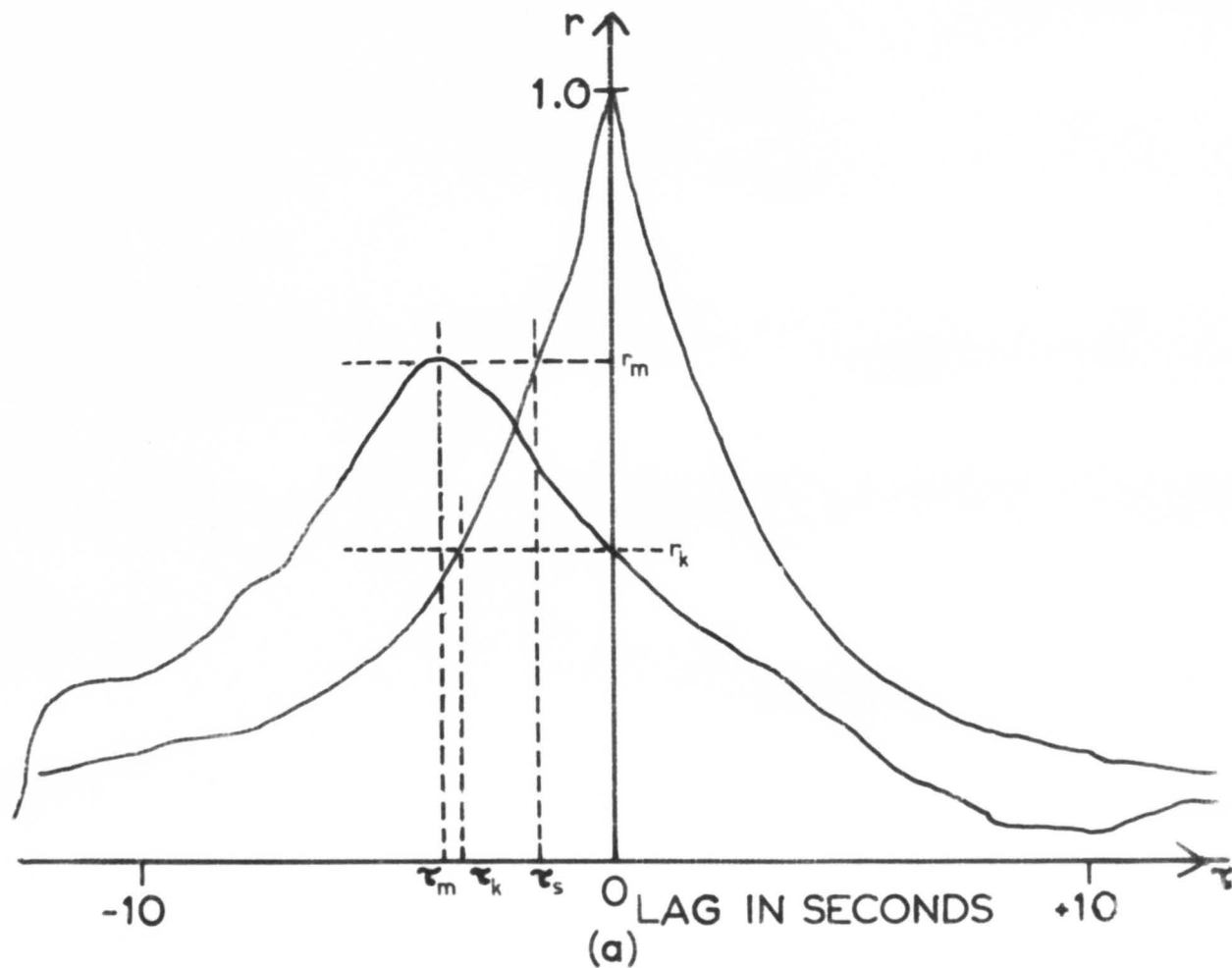


(a)

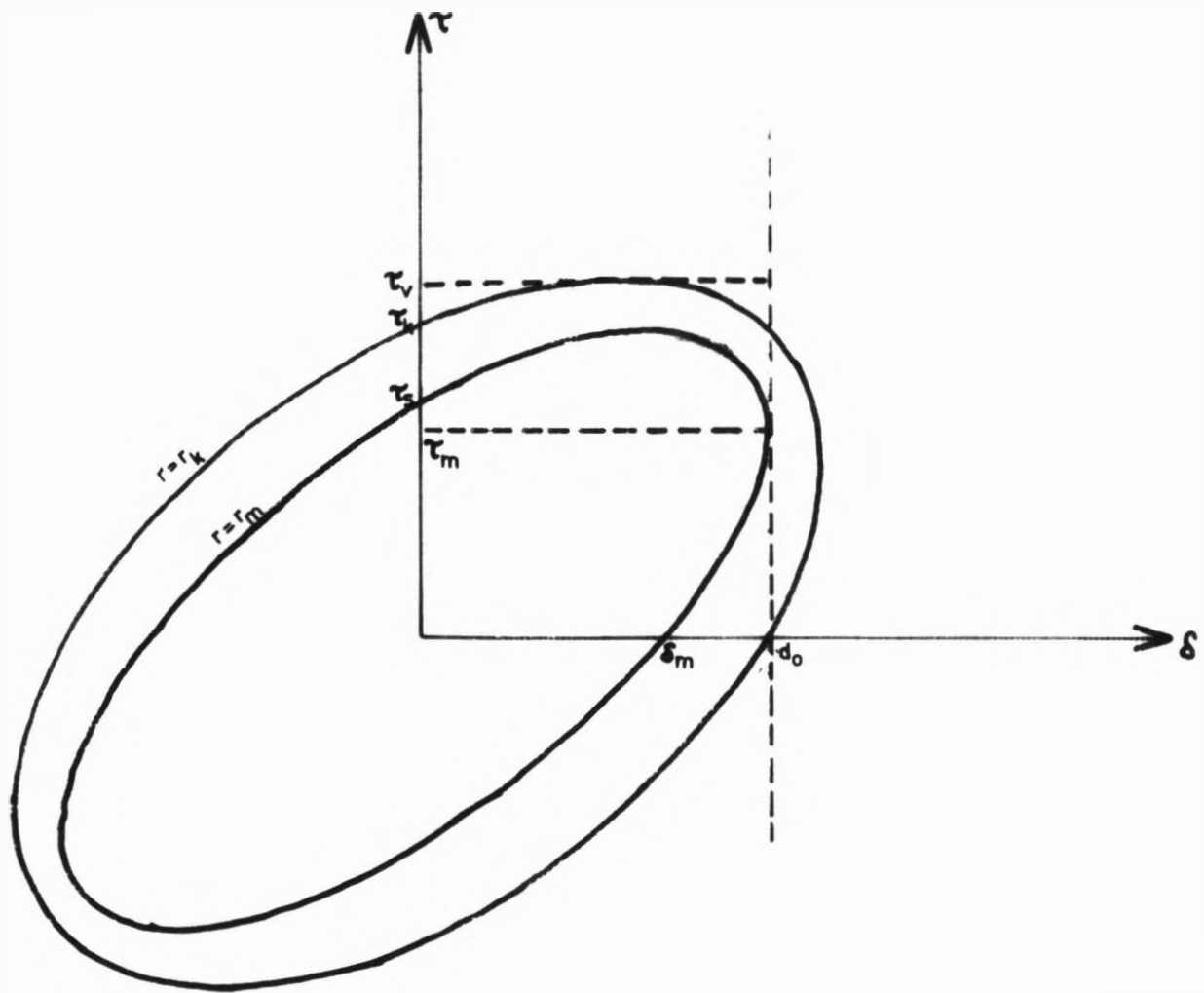
4.1 DISPLACEMENT AND VELOCITY CO-ORDINATES OF DIFFRACTION PATTERN



(b)

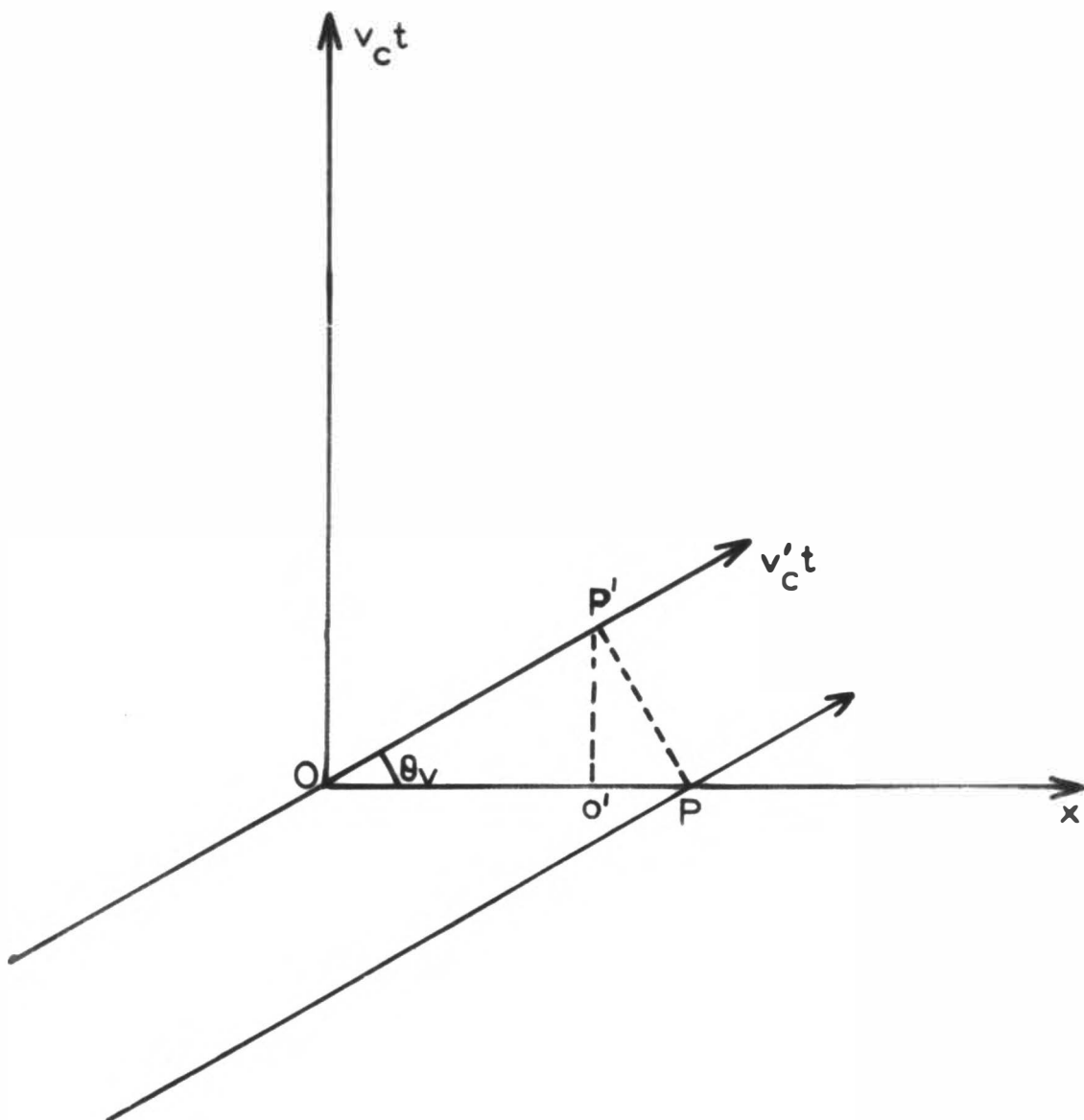


4.2(a) EXAMPLES OF AUTO- AND CROSS-CORRELATION FUNCTIONS

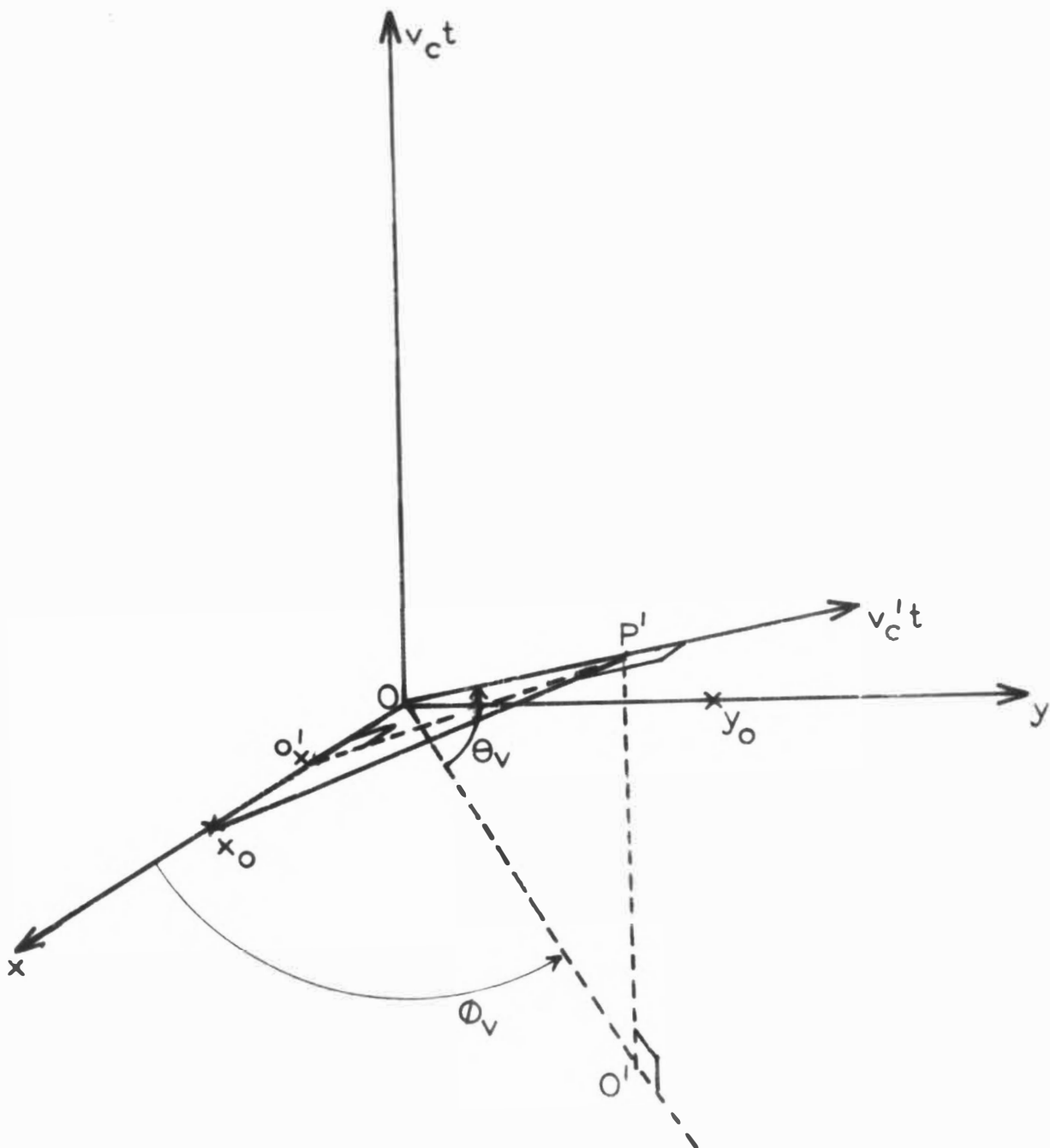


4.2(b) EXAMPLES OF CORRELATION ELLIPSES

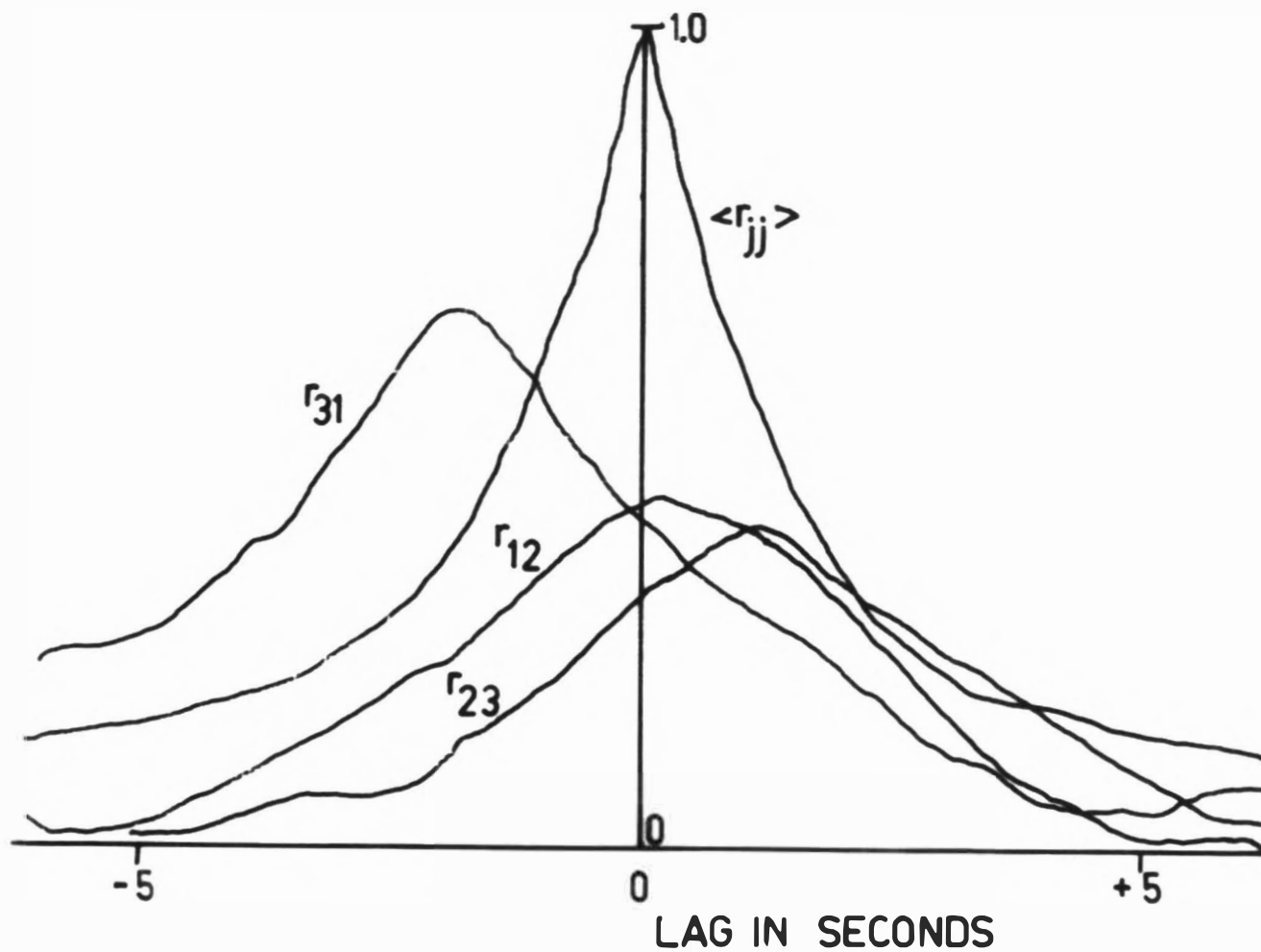
(b)



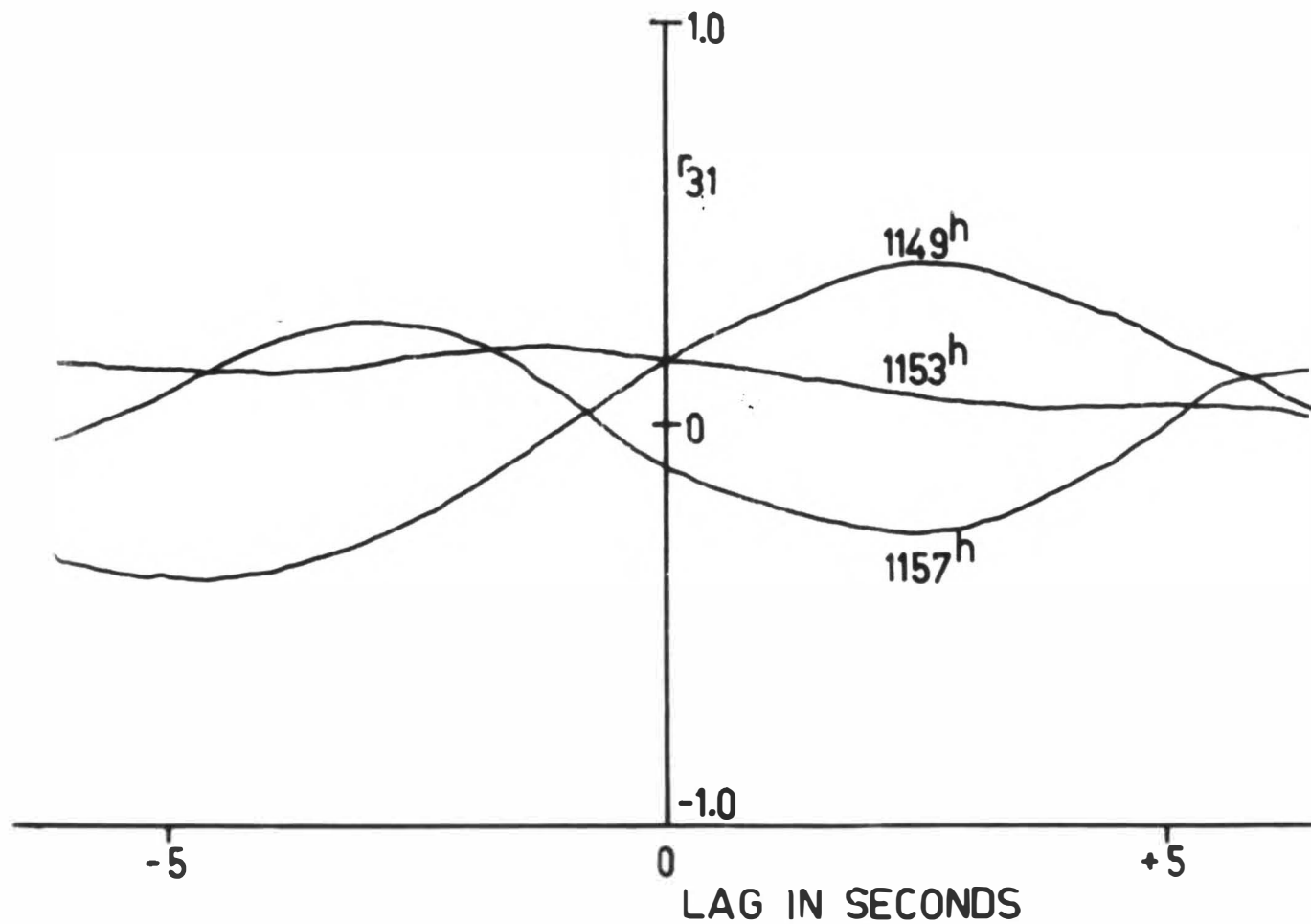
4.3 VELOCITY PARAMETERS IN TWO DIMENSIONS



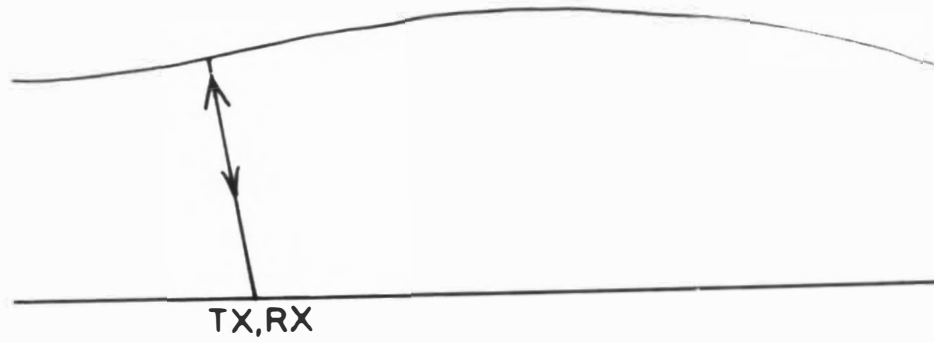
4.4 VELOCITY PARAMETERS IN THREE DIMENSIONS



6.1 A SET OF EXPERIMENTAL CORRELOGRAMS

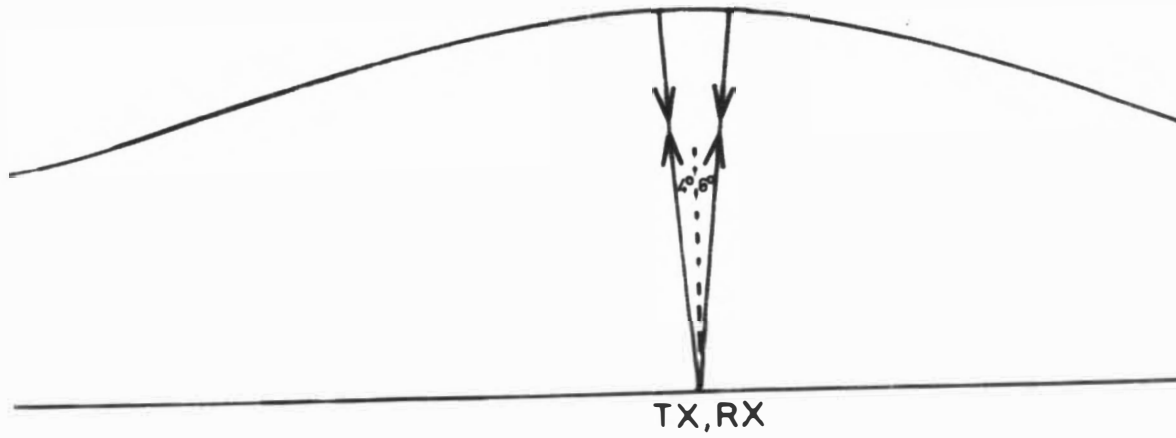


6.2 CORRELOGRAMS SHOWING SLOW PHASE DRIFT

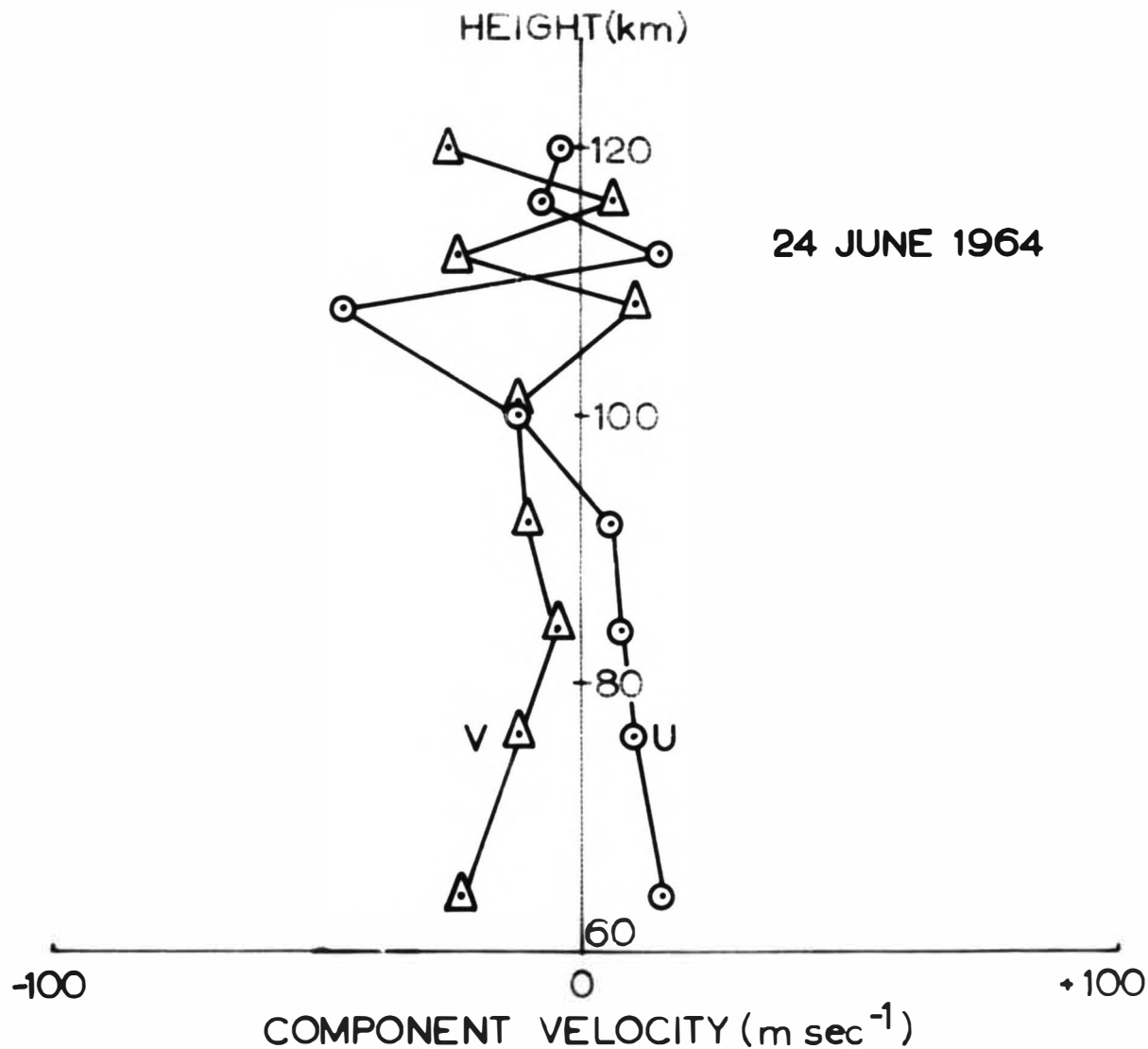


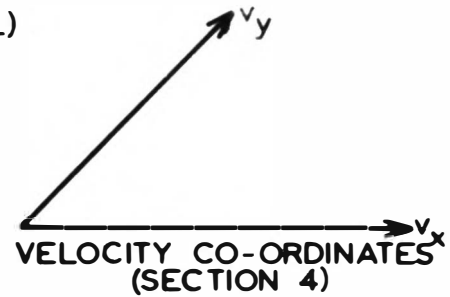
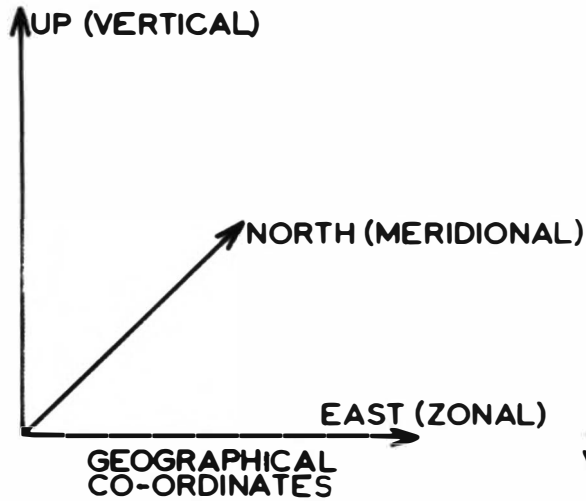
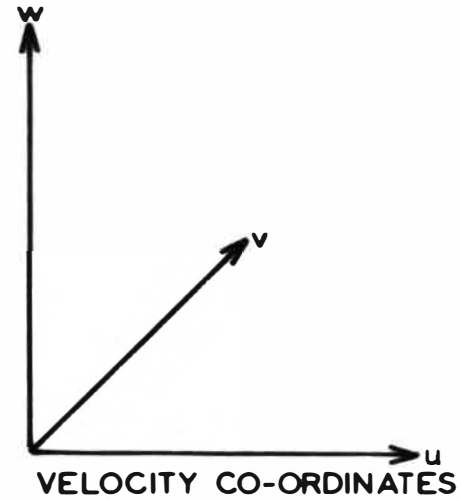
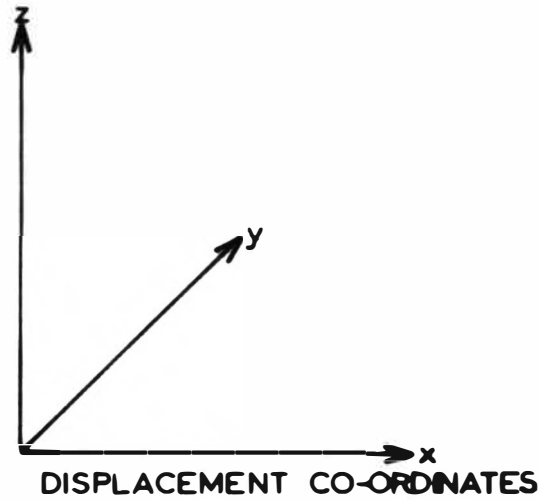
(a)

6.3 EFFECT OF LARGE SCALE IRREGULARITIES ON REFLECTION ANGLE



(b)

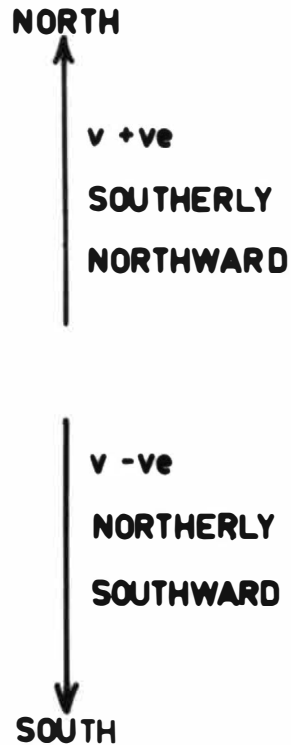




7.2 CO-ORDINATE SYSTEMS



(a) ZONAL COMPONENT



(b) MERIDIONAL COMPONENT
WIND VECTOR TERMINOLOGY

FIGURE 7.3

7.4 CHARACTERISTICS OF A GRAVITY WAVE (HINES 1960)

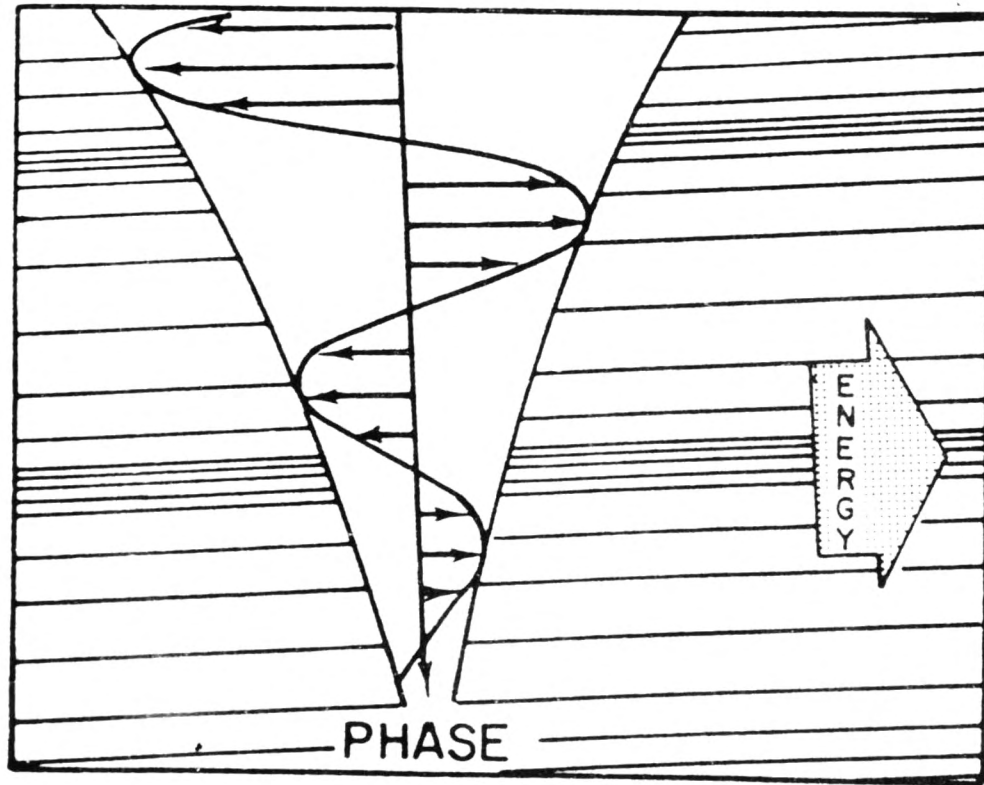
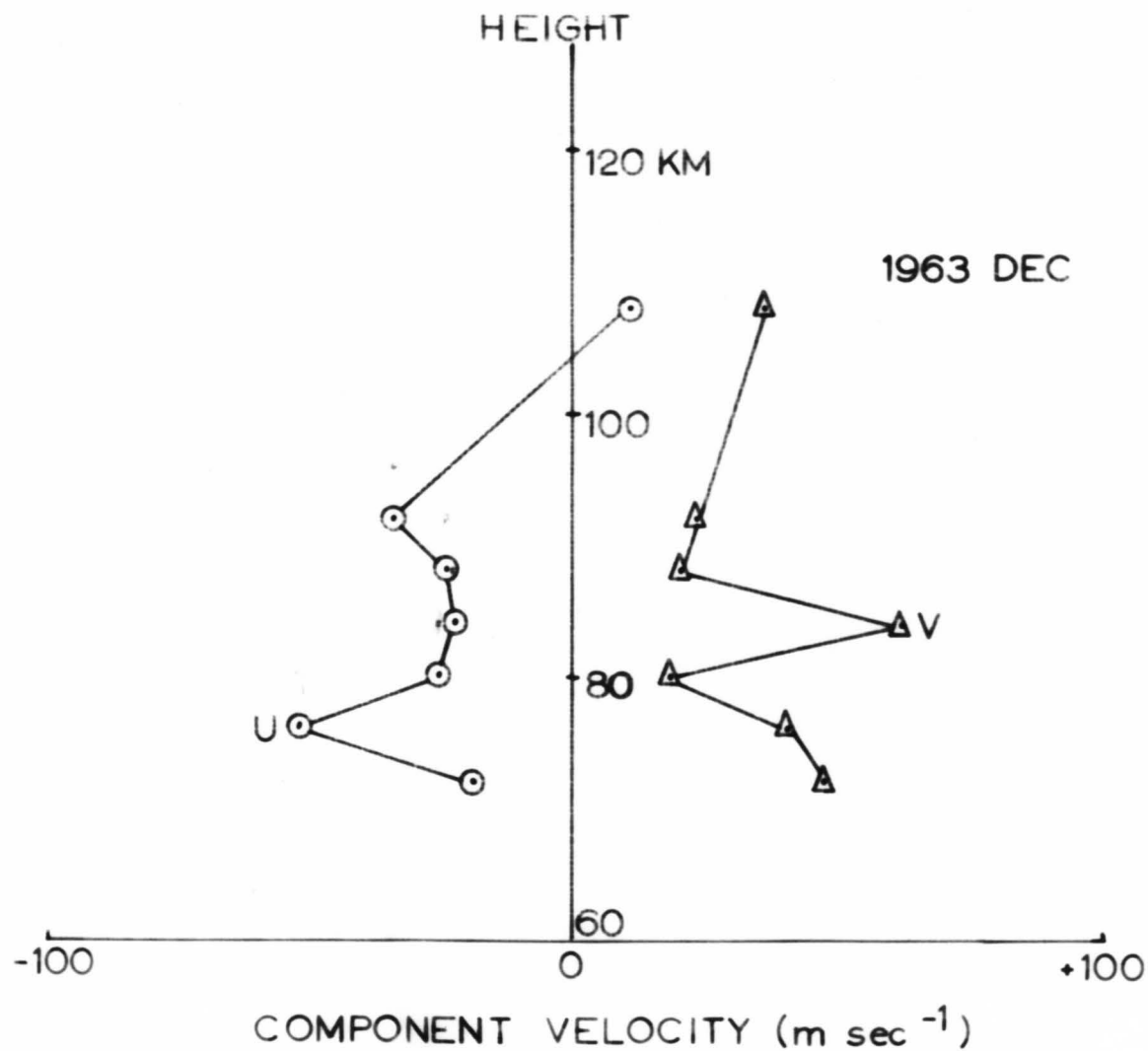
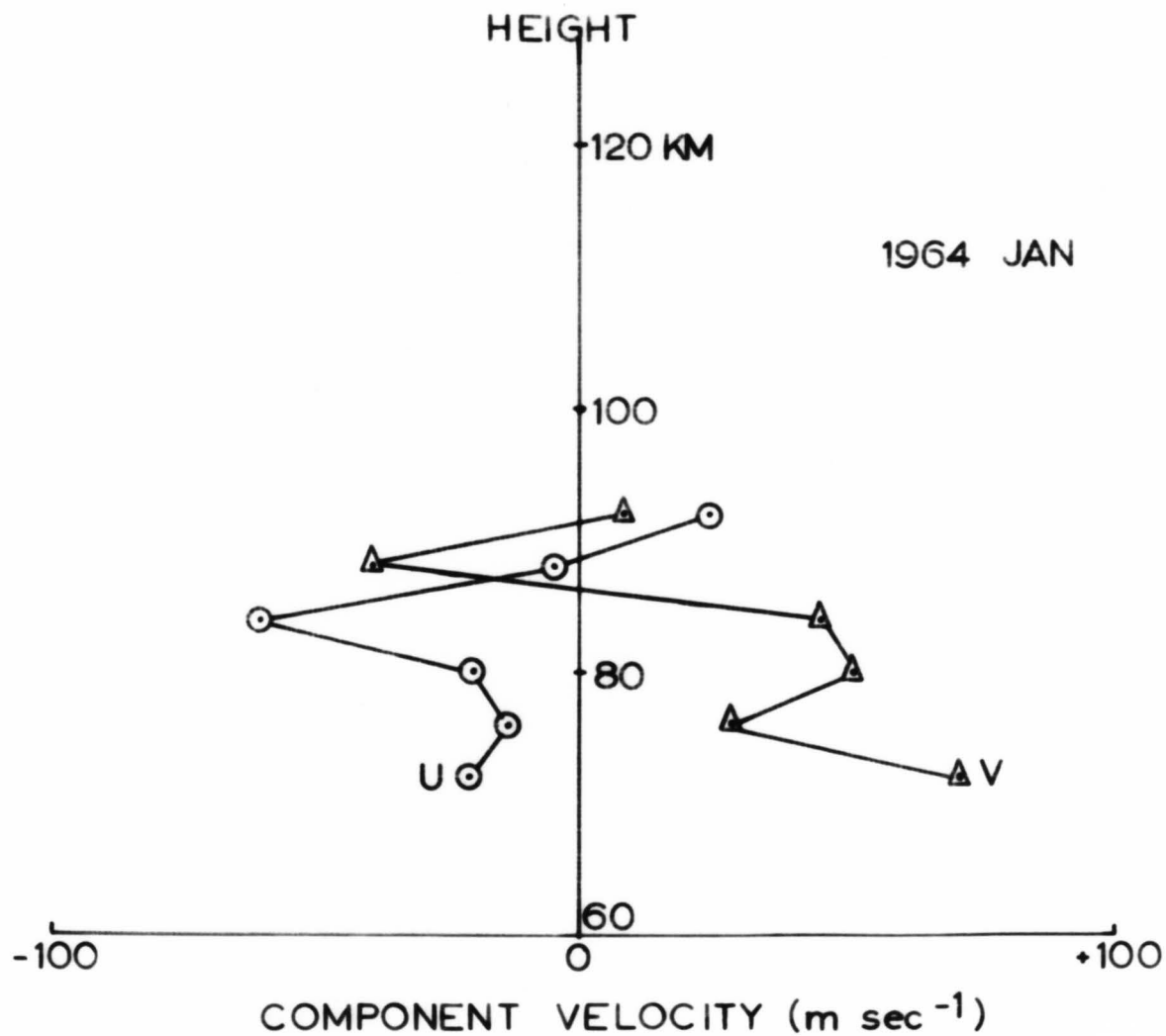


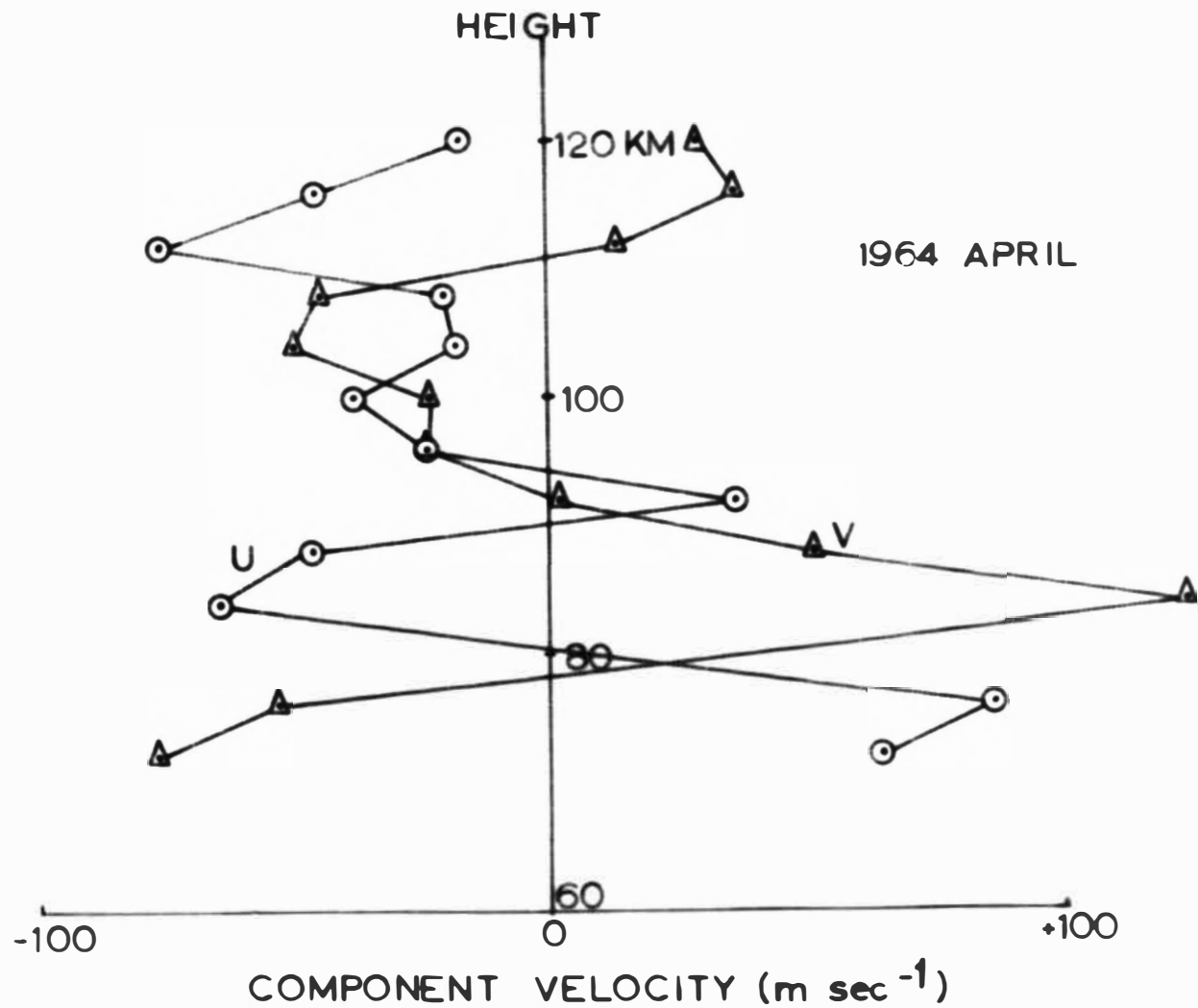
FIG. 2. Pictorial representation of internal atmospheric gravity waves. Instantaneous velocity vectors are shown, together with their instantaneous and over-all envelopes. Density variations are depicted by a background of parallel lines lying in surfaces of constant phase. Phase progression is essentially downwards in this case, and energy propagation obliquely upwards; gravity is directed vertically downwards.



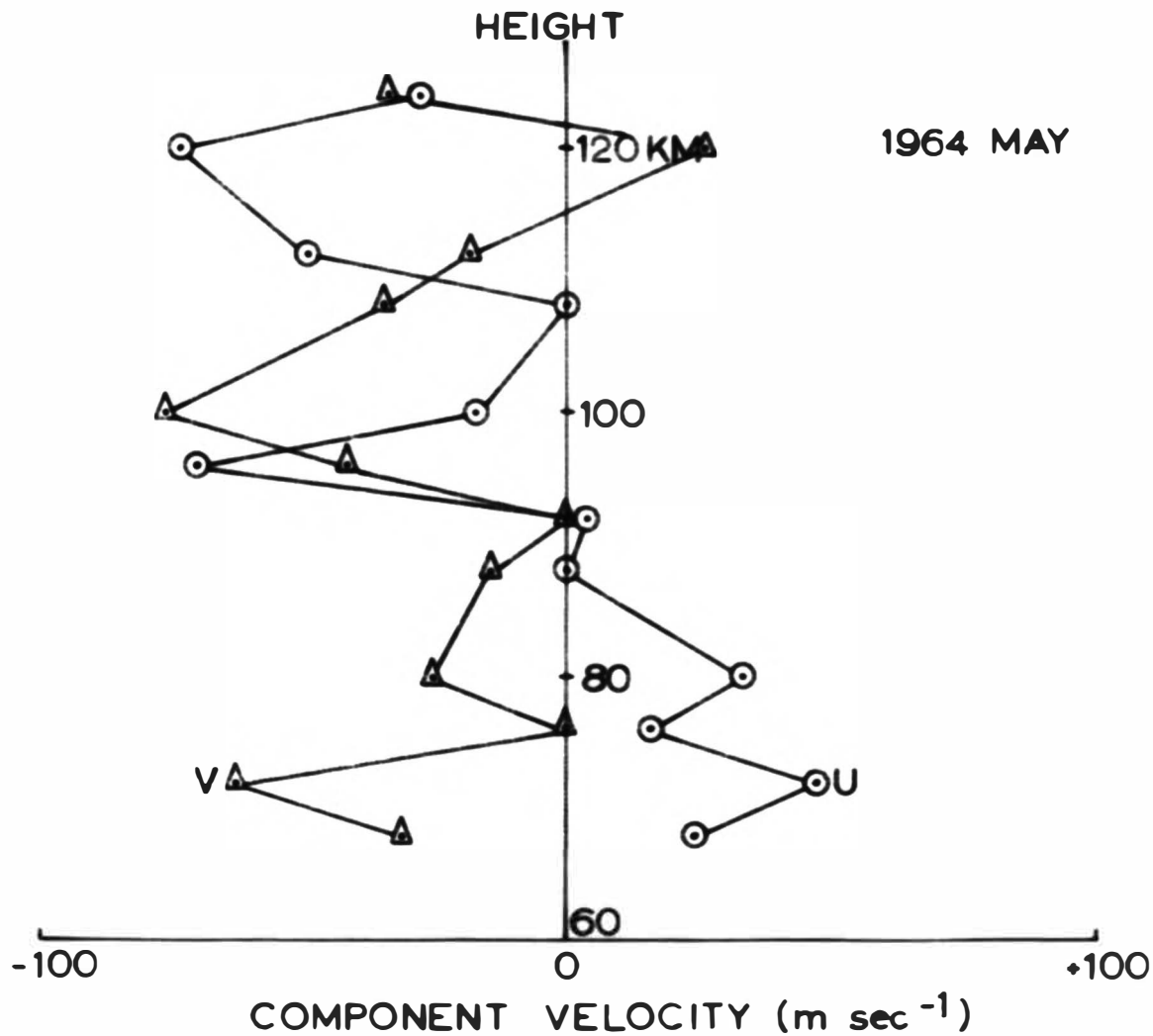
7.5 MEAN WINDS, DECEMBER 1963



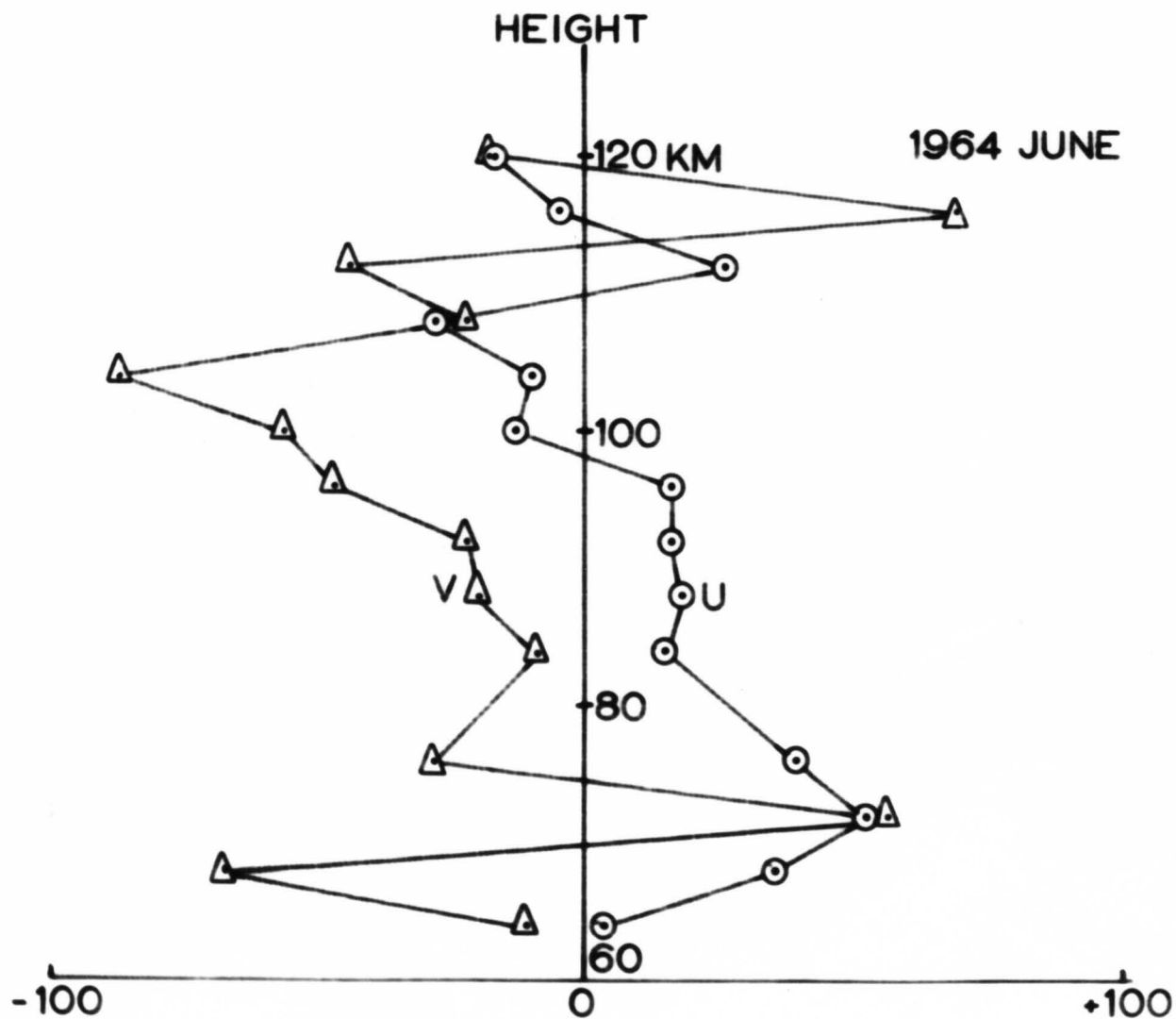
7.6 MEAN WINDS, JANUARY 1964

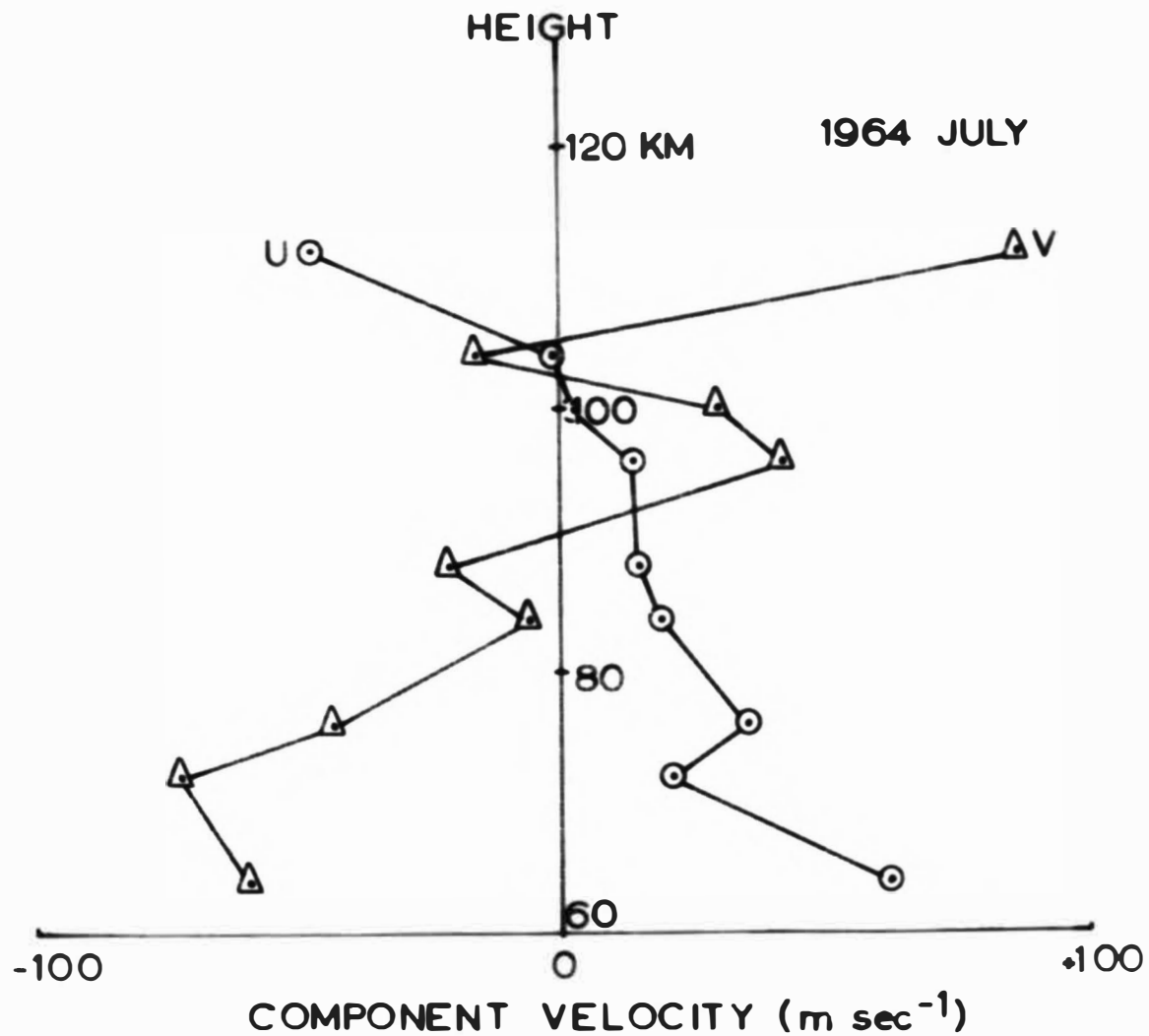


7.7 MEAN WINDS, APRIL 1964

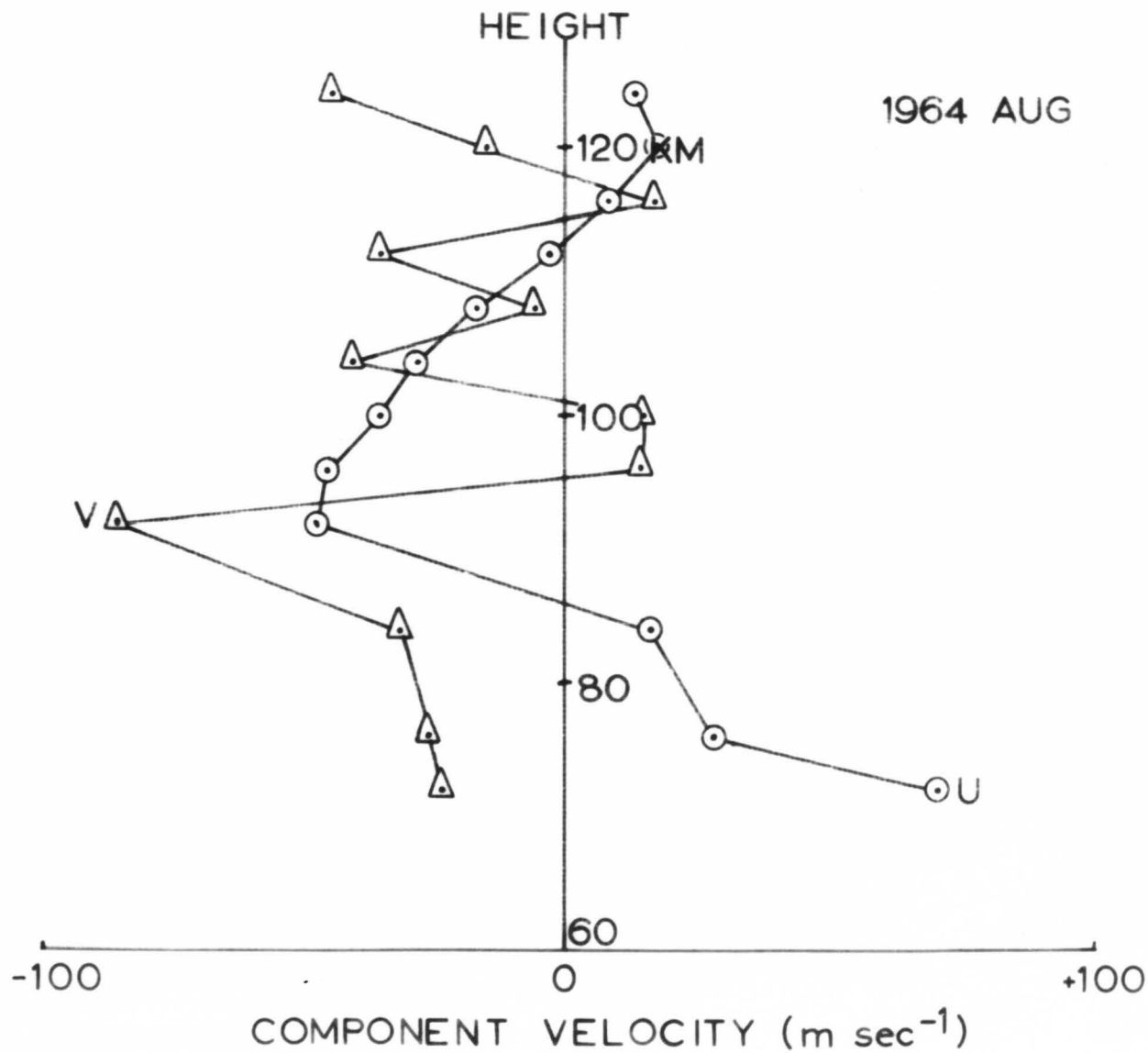


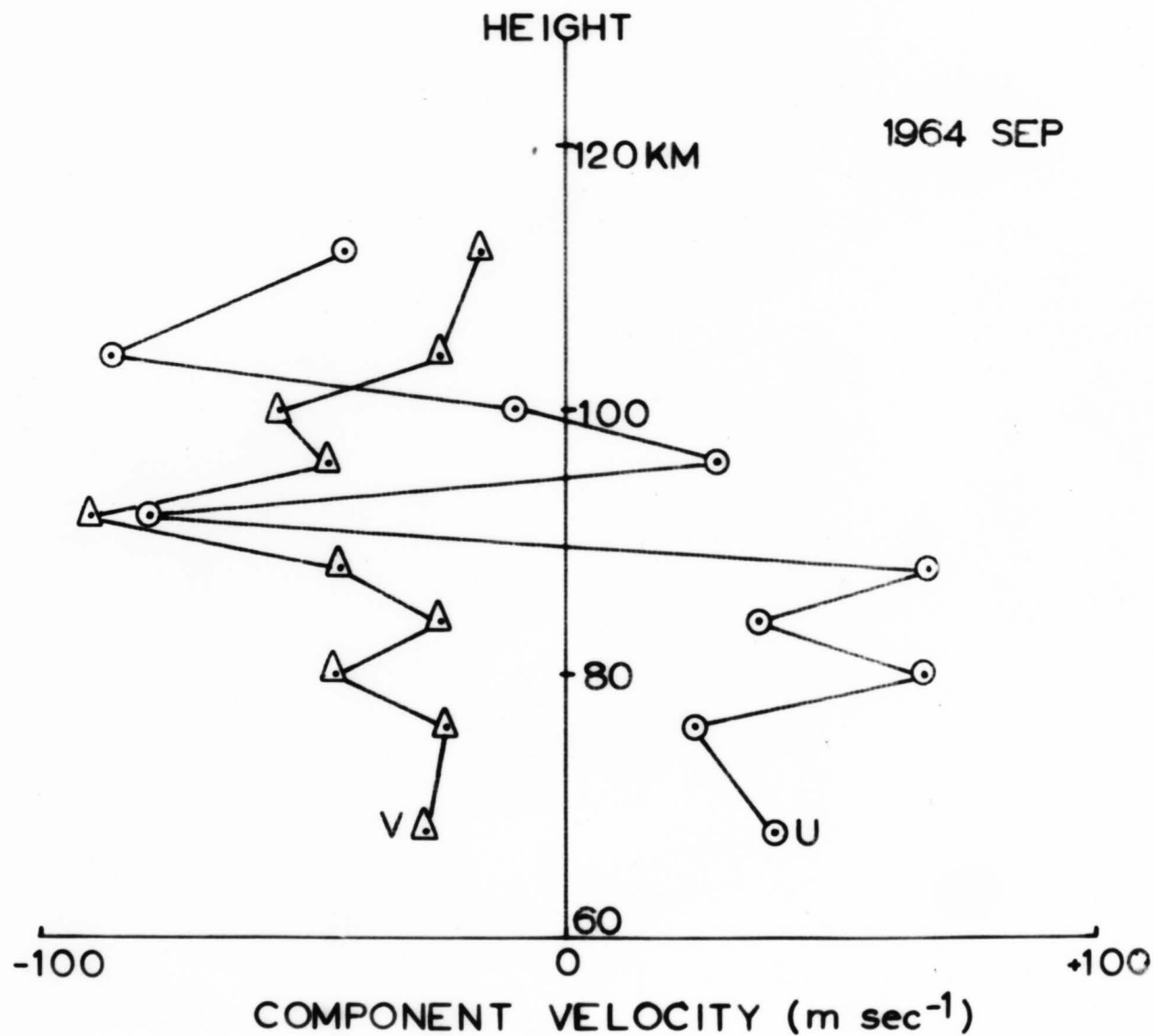
7.8 MEAN WINDS, MAY 1964





7.10 MEAN WINDS, JULY 1964





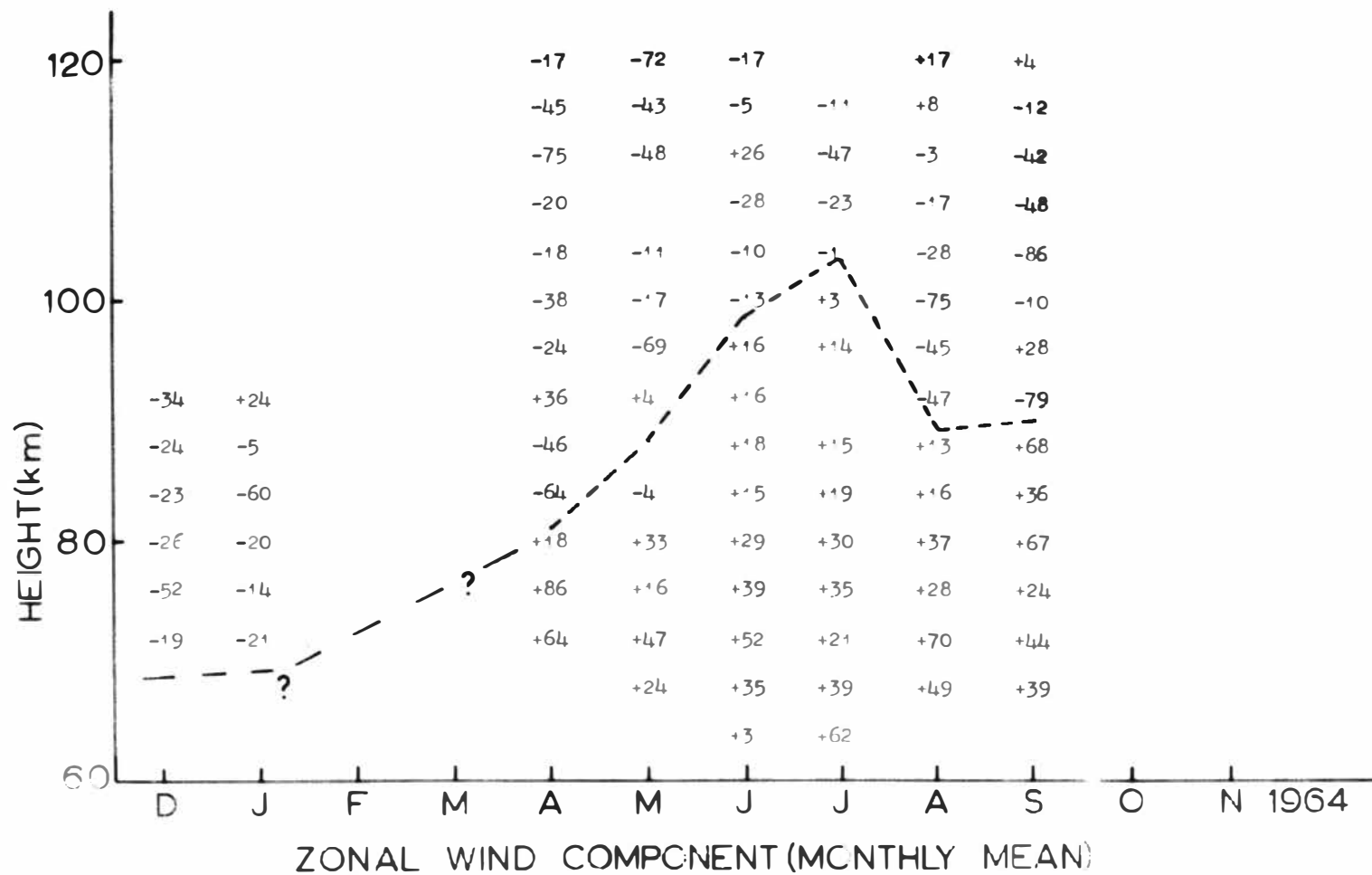


FIGURE 7.13

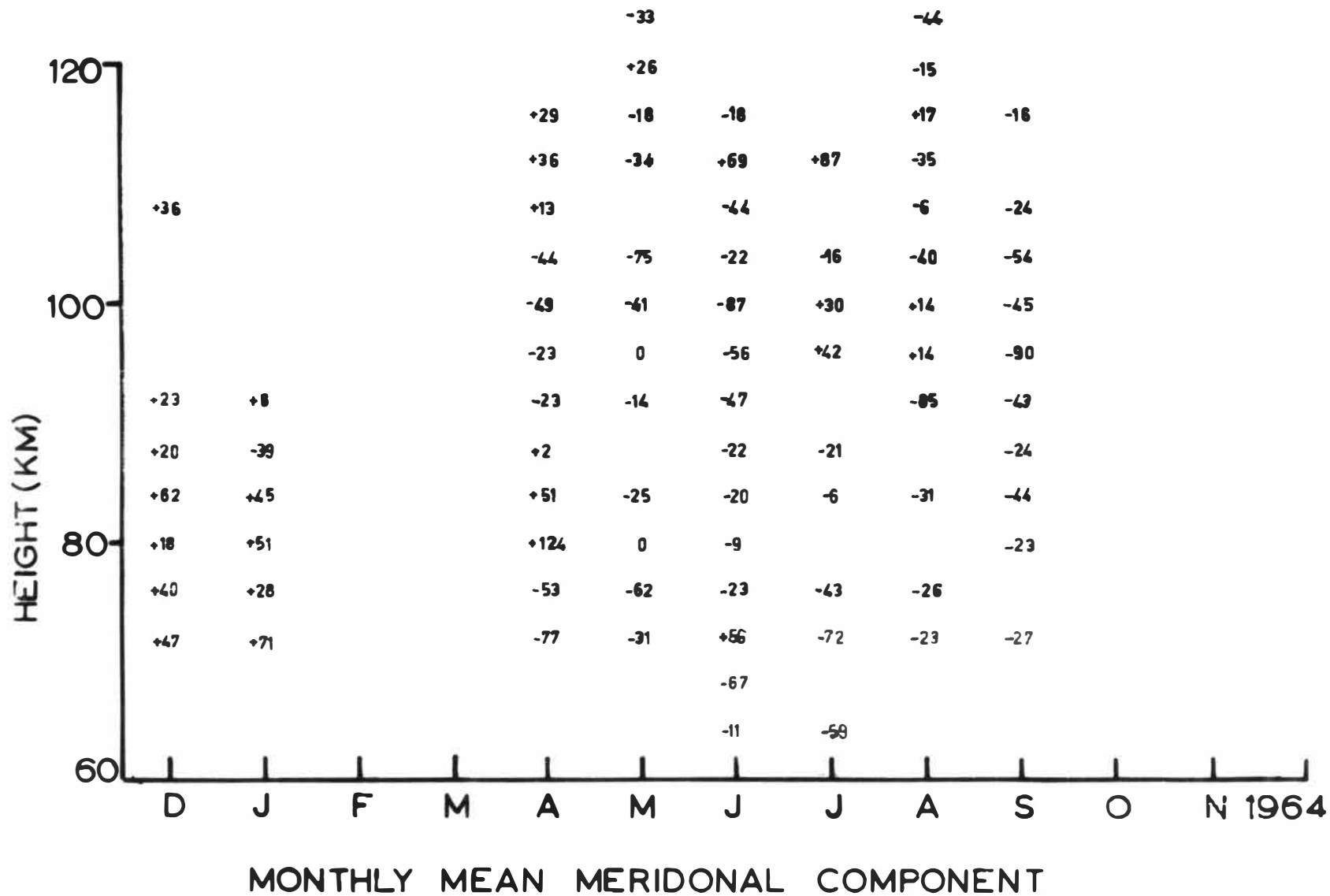
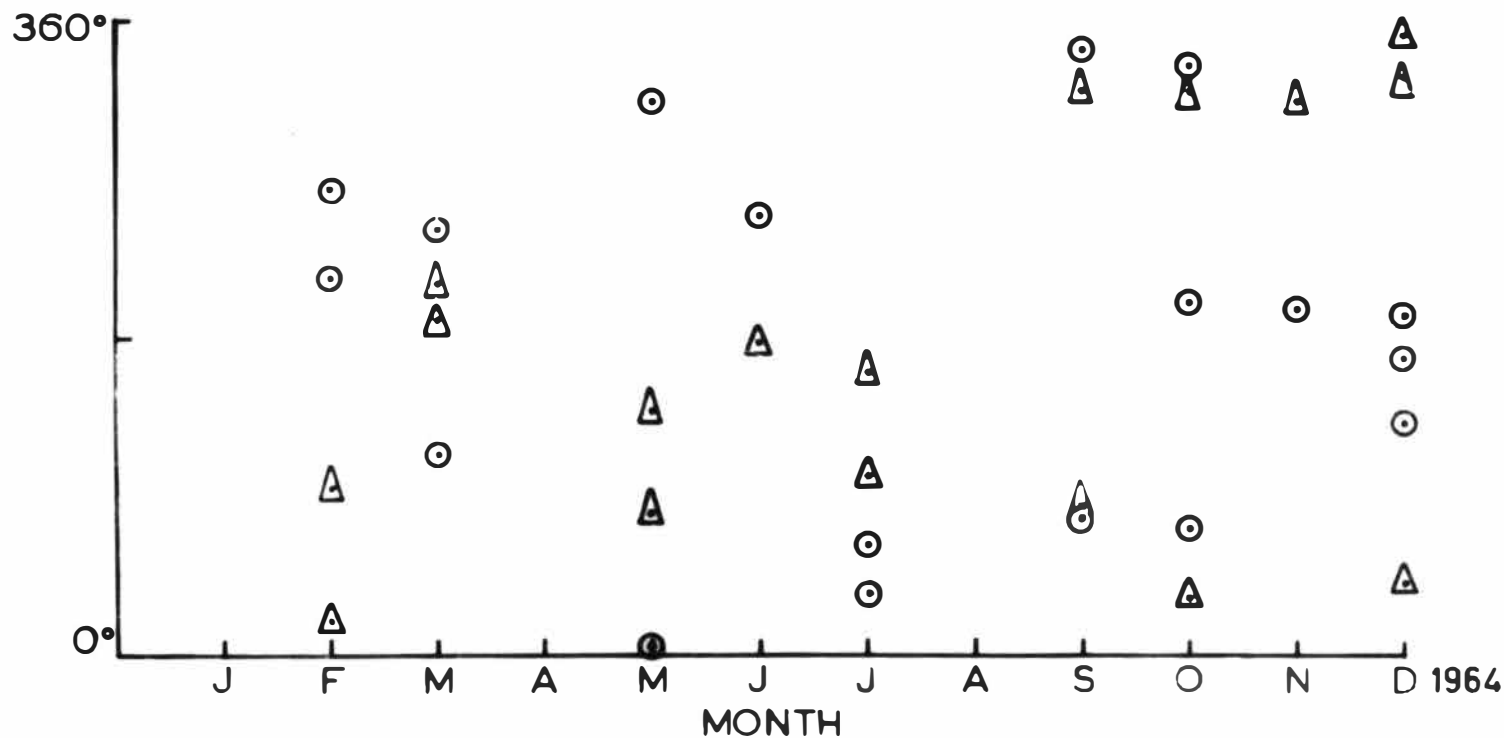


FIGURE 7.14



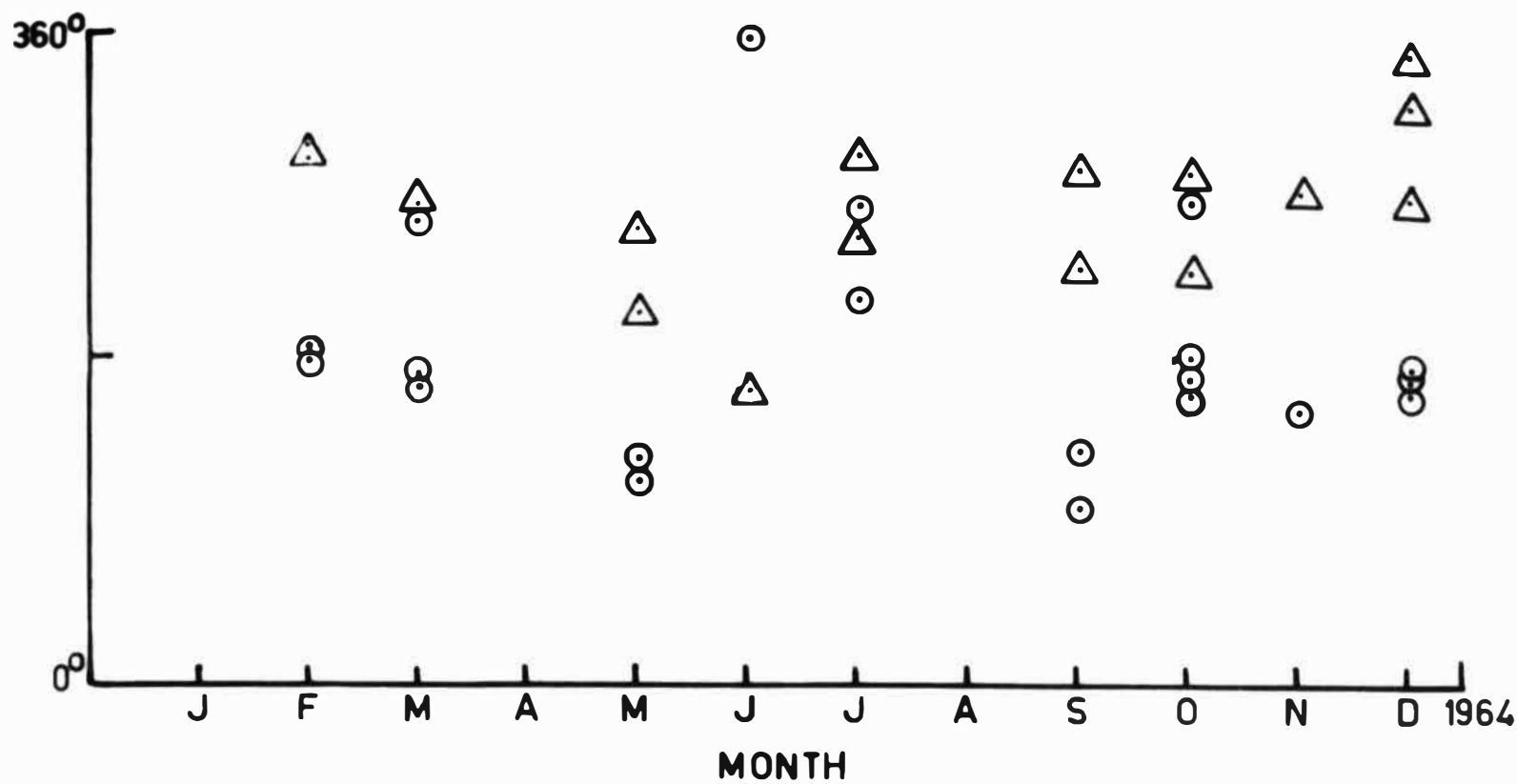
ANNUAL VARIATION OF PHASE OF SEMI-DIURNAL COMPONENTS

△ V

○ U

DATA FROM ELFORD(1959) 85 - 94 KM

FIGURE 7.15



ANNUAL VARIATION OF PHASE OF DIURNAL COMPONENTS

△ U

○ V

DATA FROM ELFORD (1959) 85-94 KM

FIGURE 7.16

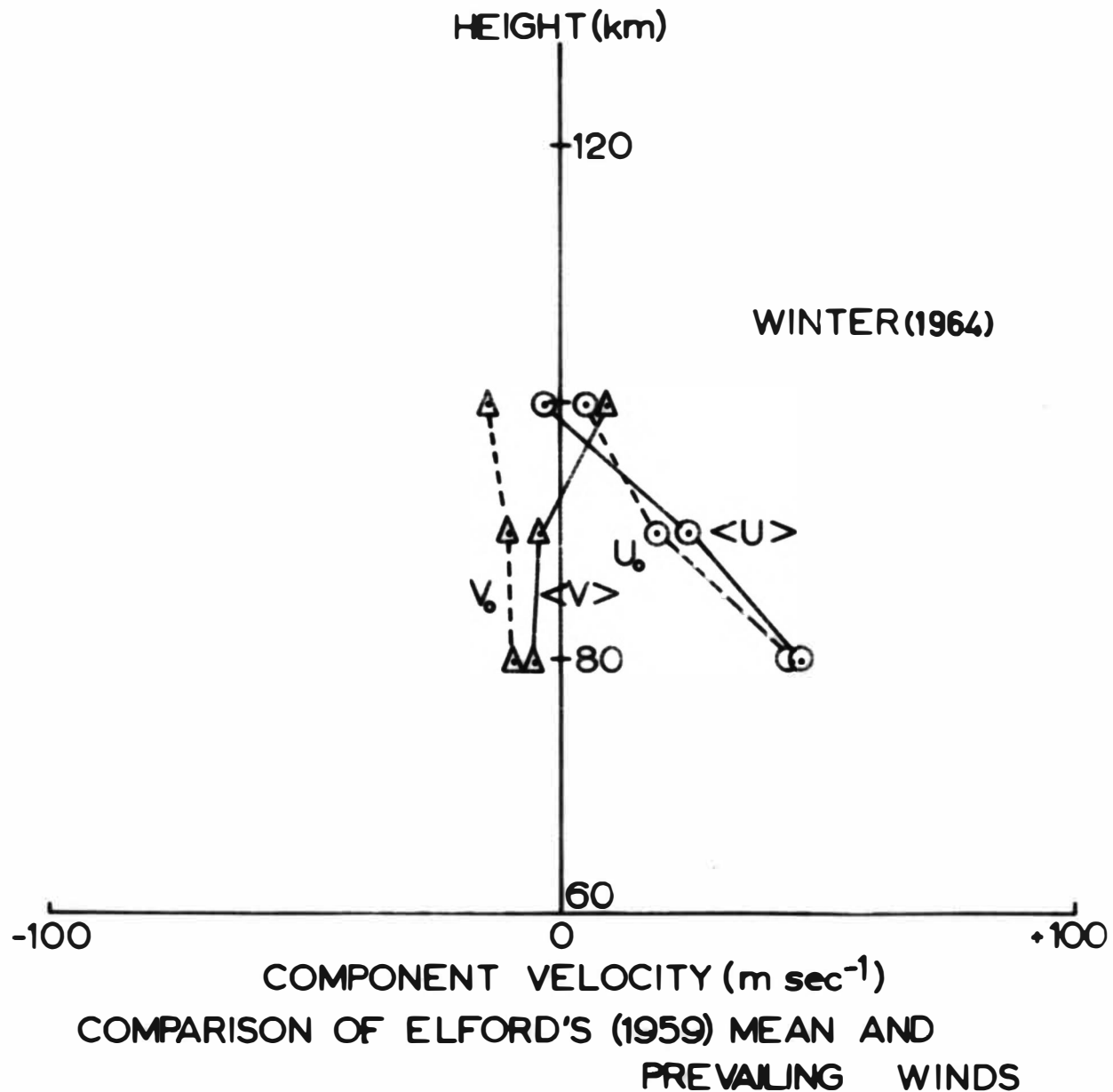
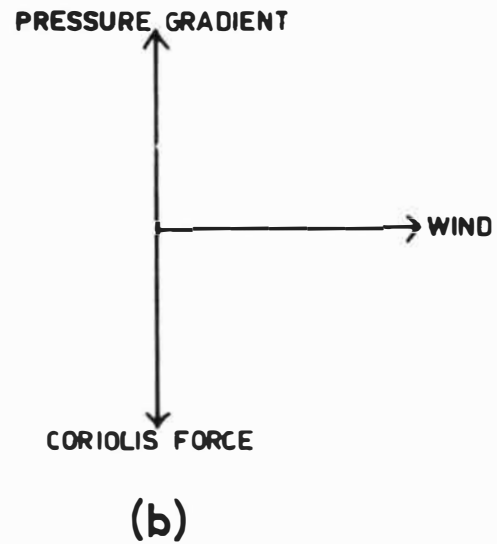
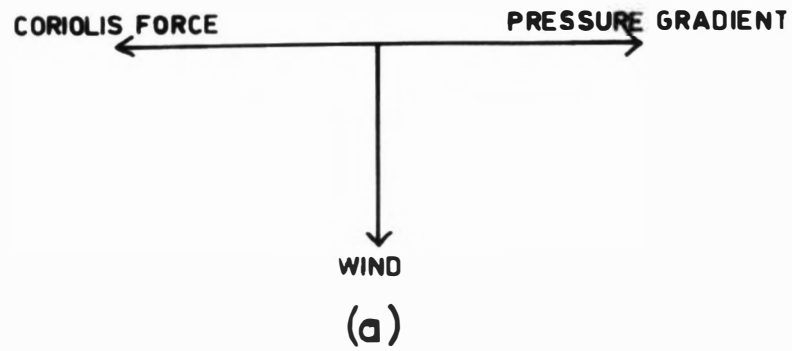
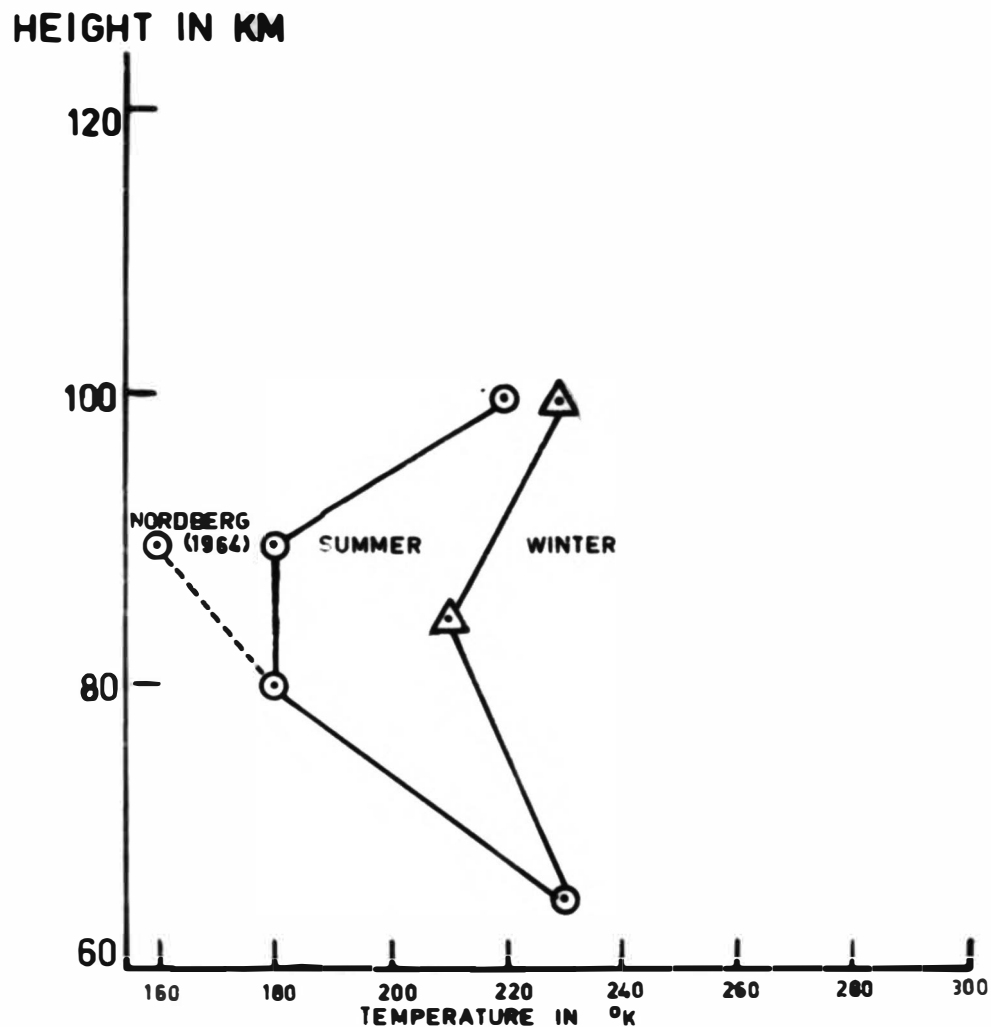


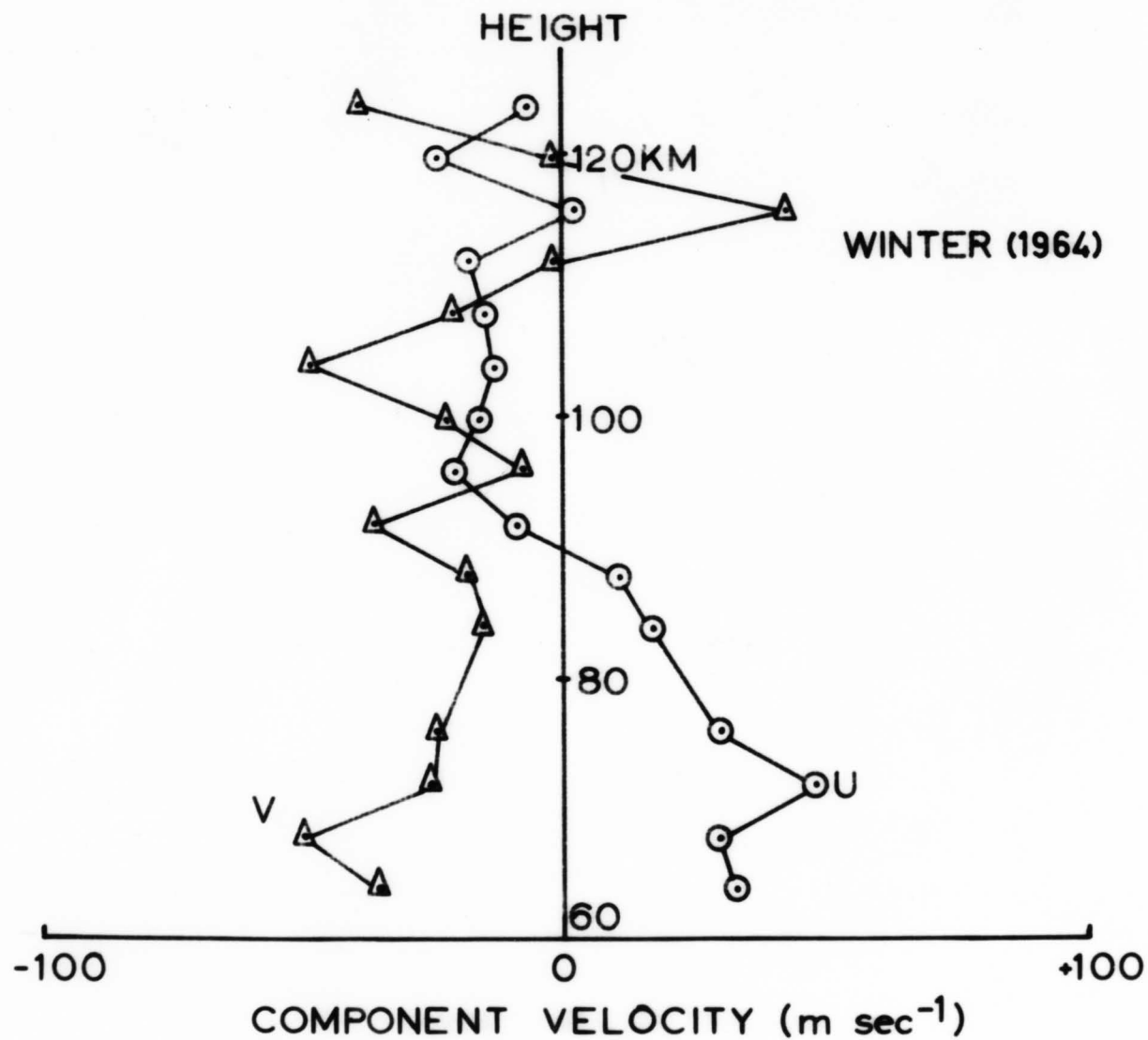
FIGURE 7.17



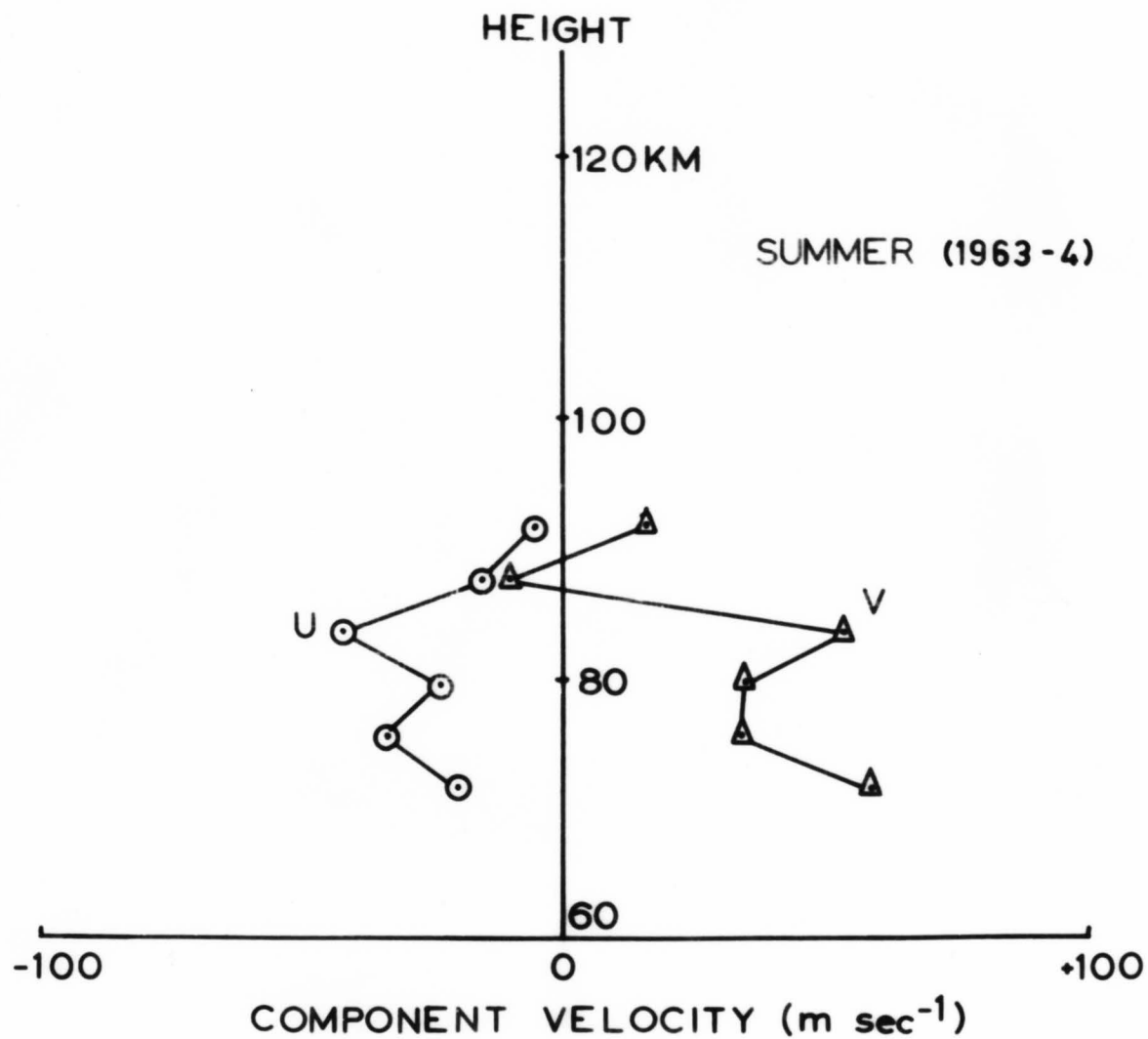


POSSIBLE MEAN TEMPERATURE PROFILE

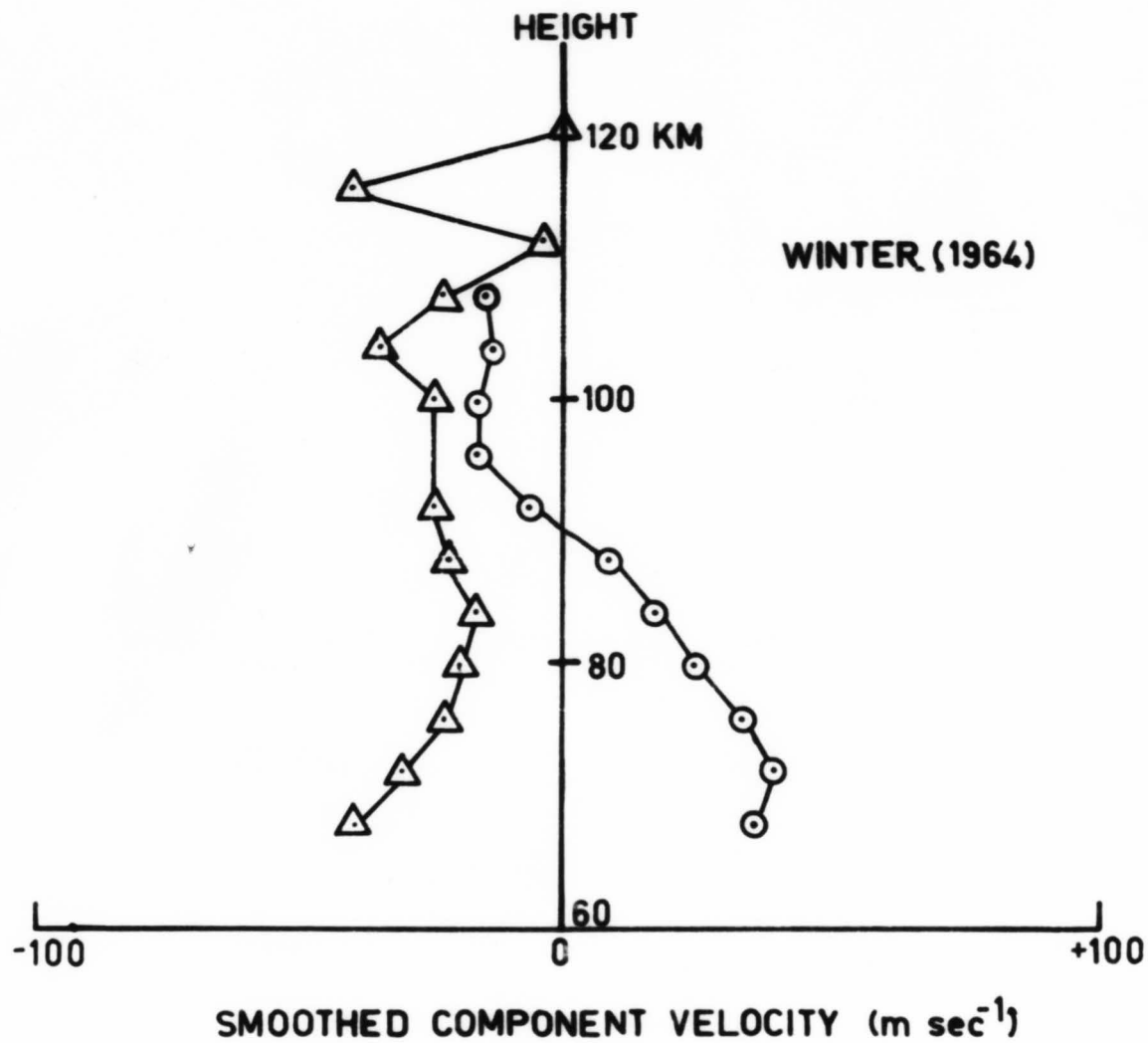
FIGURE 8.2



8.3 MEAN WINDS, WINTER 1964



8.4 MEAN WINDS, SUMMER 1964



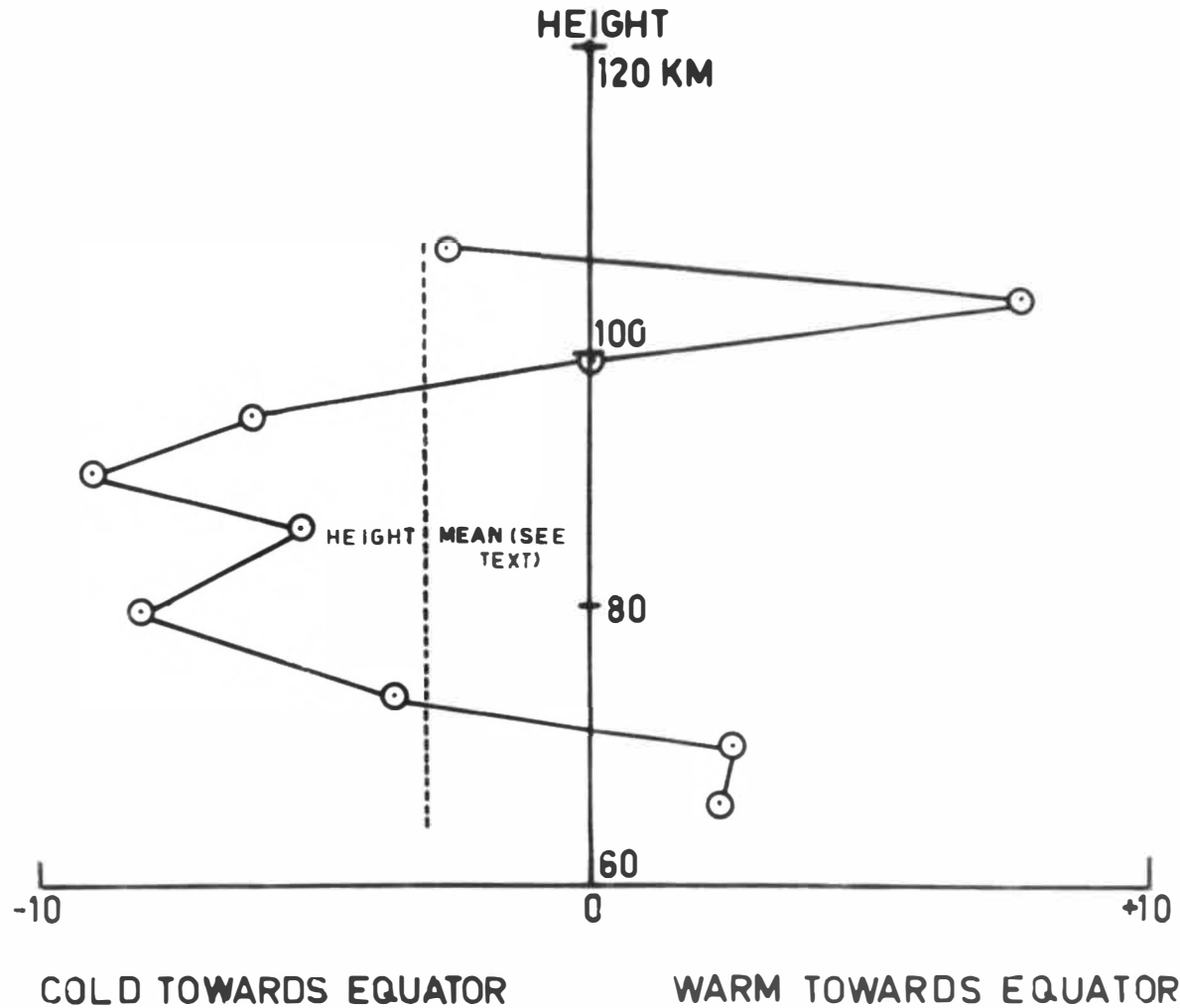
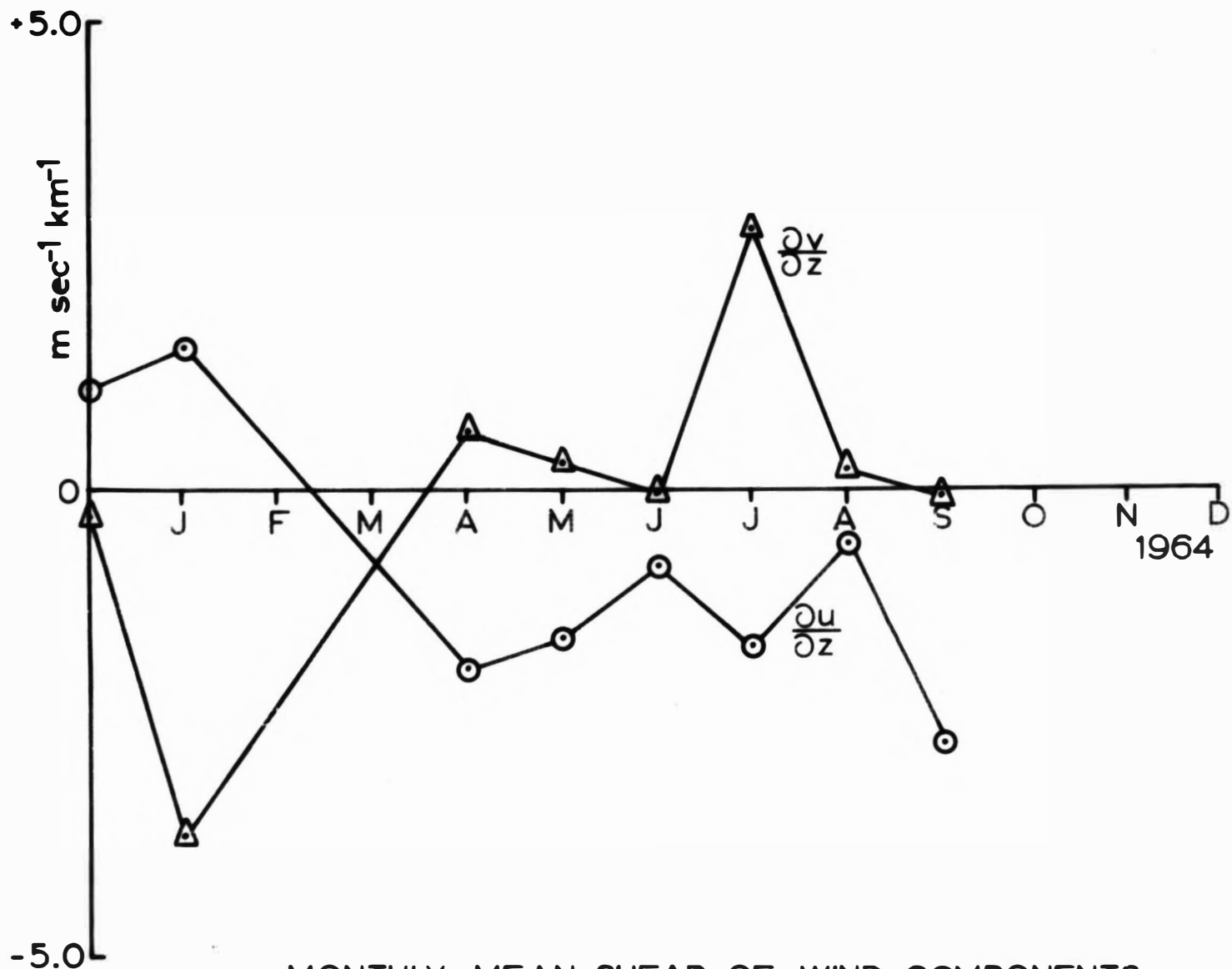


FIGURE 8.6
MEAN MERIDIONAL TEMPERATURE GRADIENT (WINTER 1964)
IN DEGREES KELVIN FOR 10 DEGREES INCREASE IN LATITUDE



MONTHLY MEAN SHEAR OF WIND COMPONENTS

FIGURE 8.7

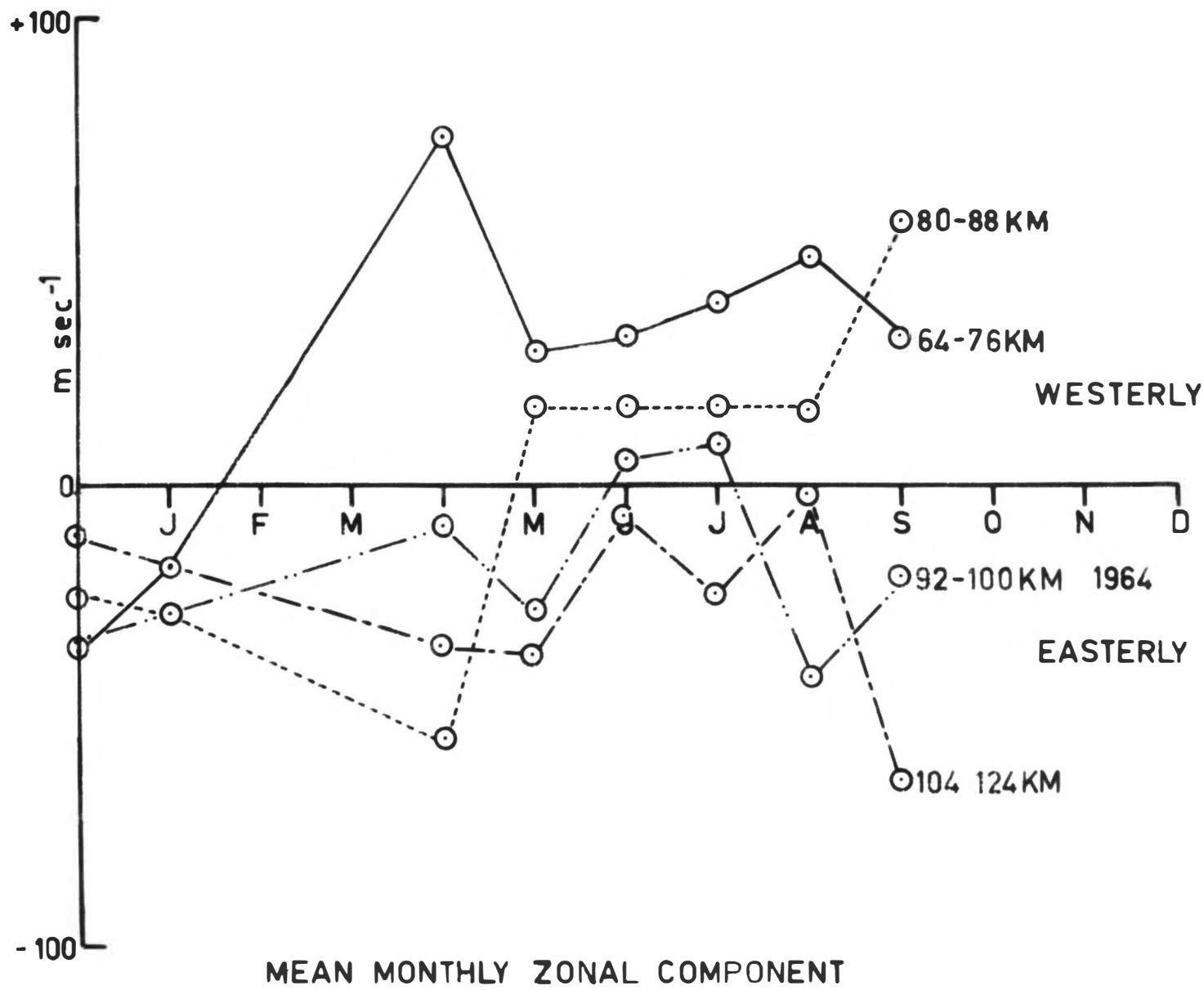


FIGURE 8.8

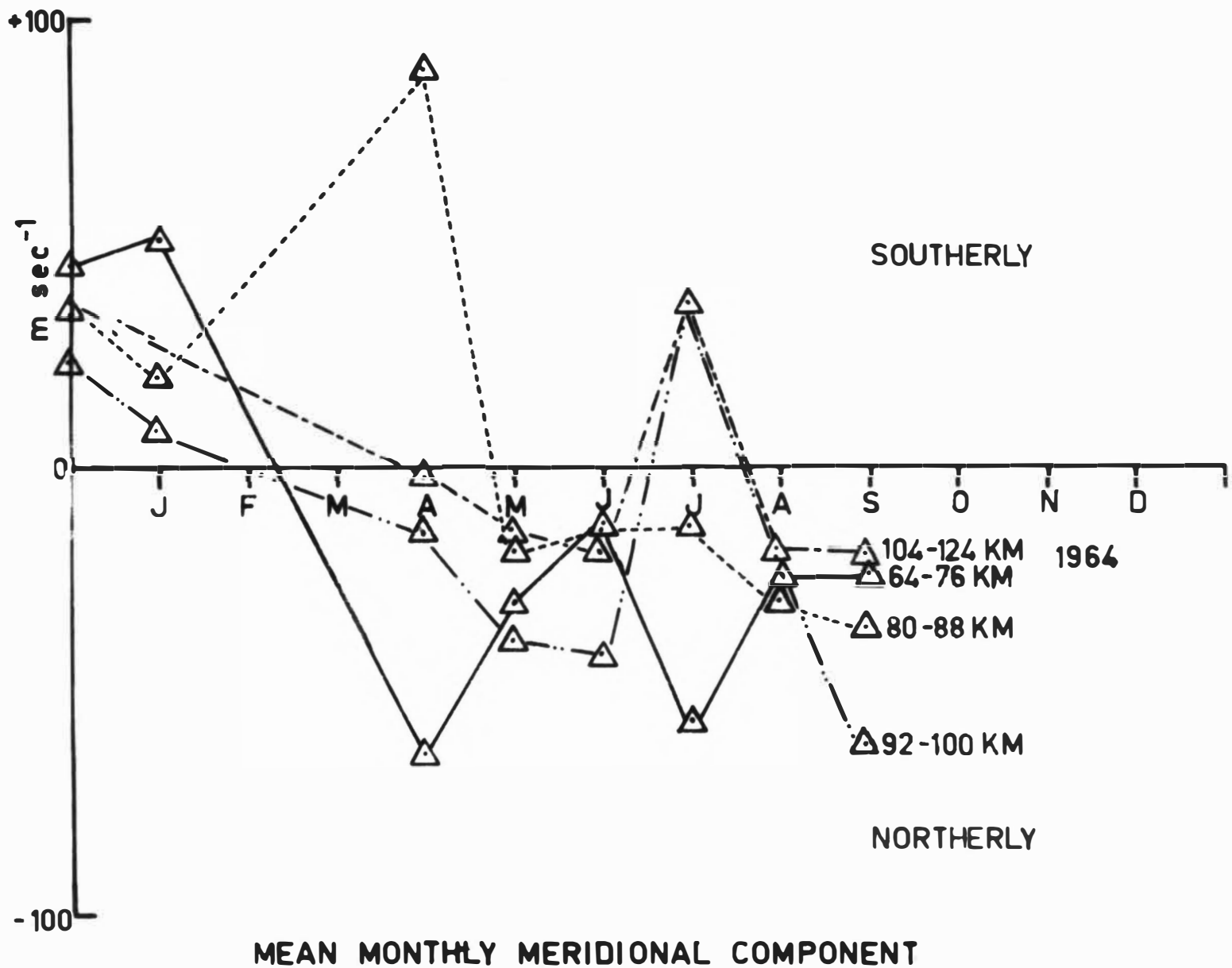


FIGURE 8.9

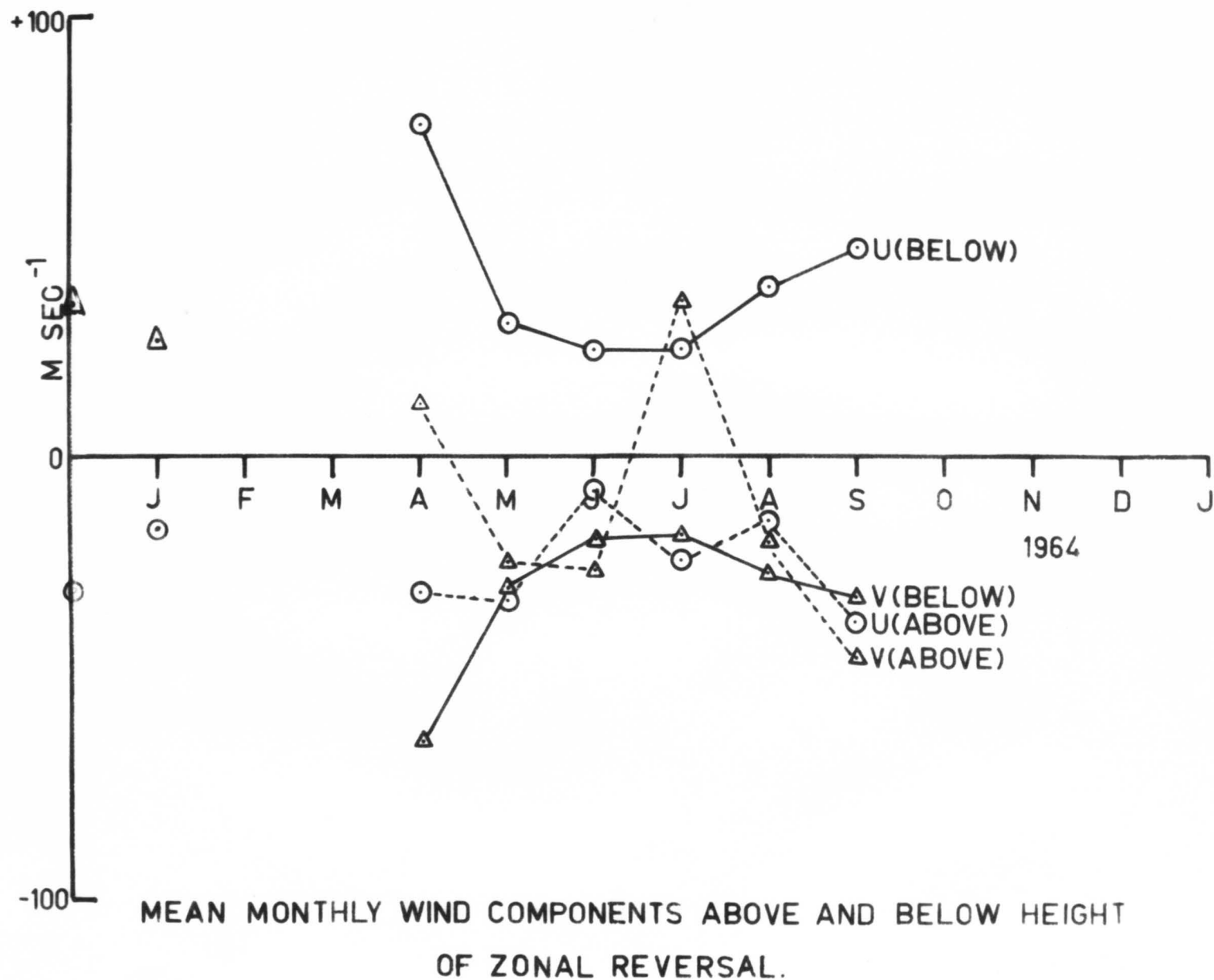


FIGURE 8.10

FIGURE A.1. RECEIVER CIRCUIT

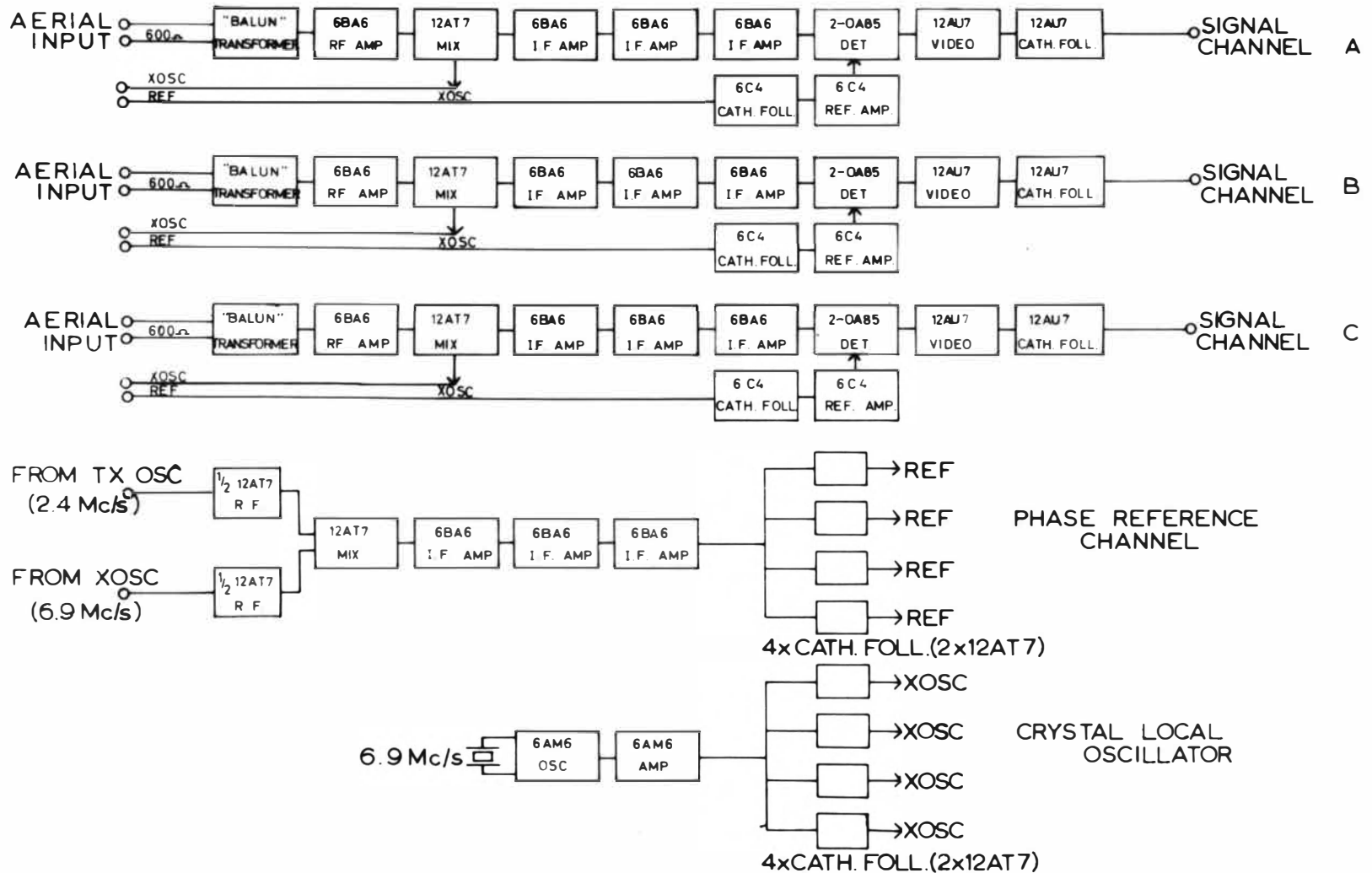


FIGURE B.1 NOR CIRCUIT

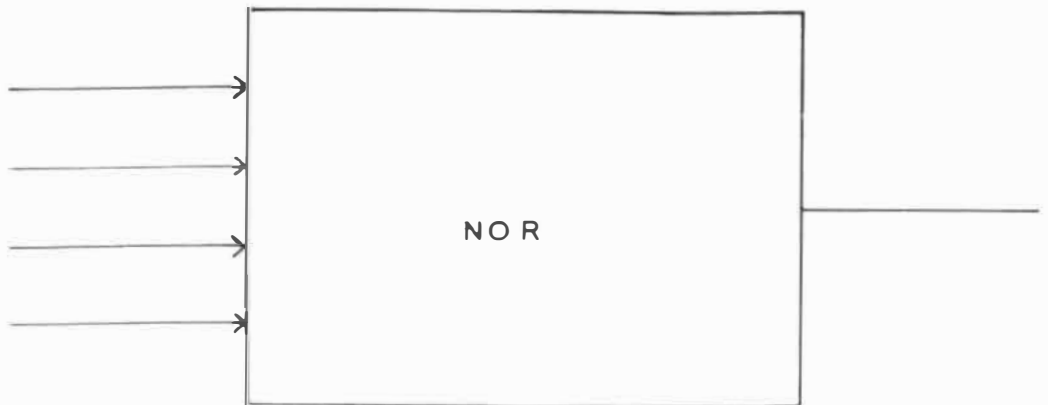
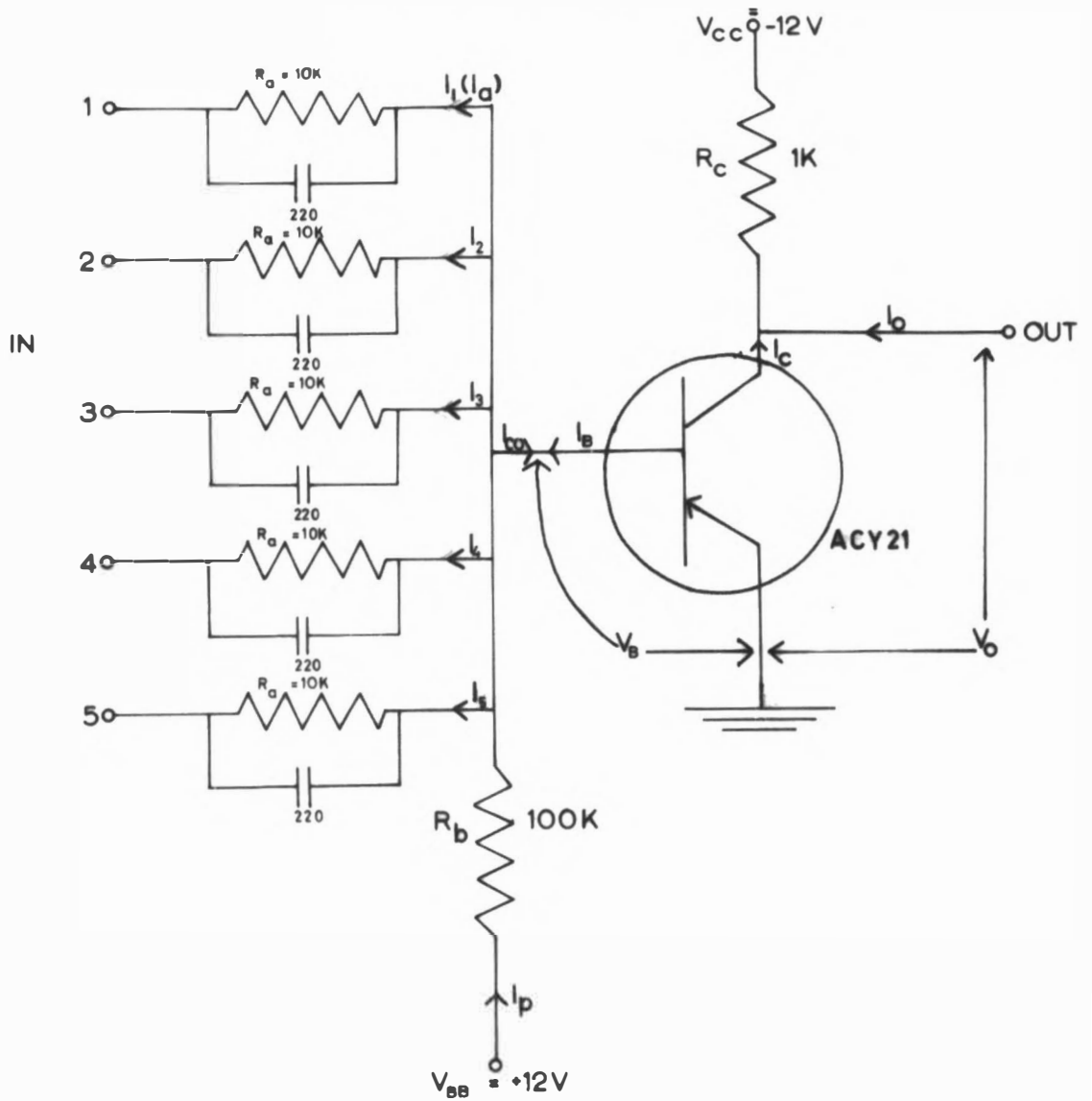


FIGURE B.2. FLIP FLOP CIRCUIT

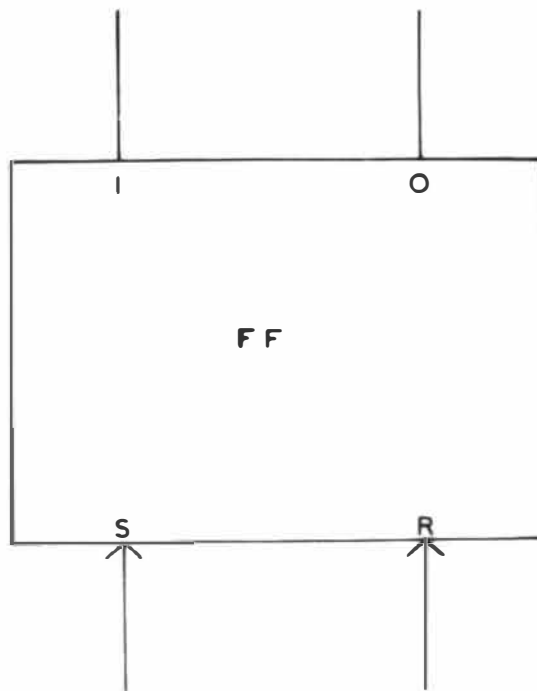
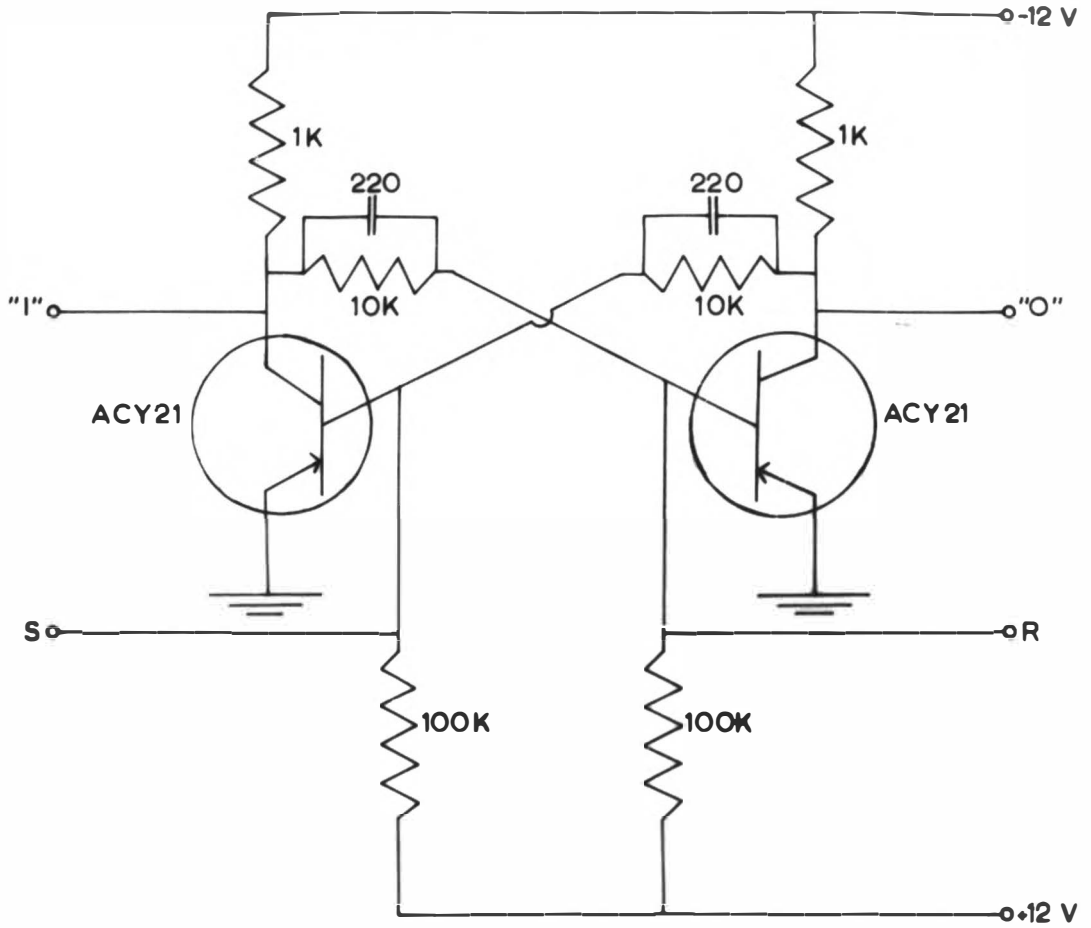


FIGURE B.3. PULSE GATE

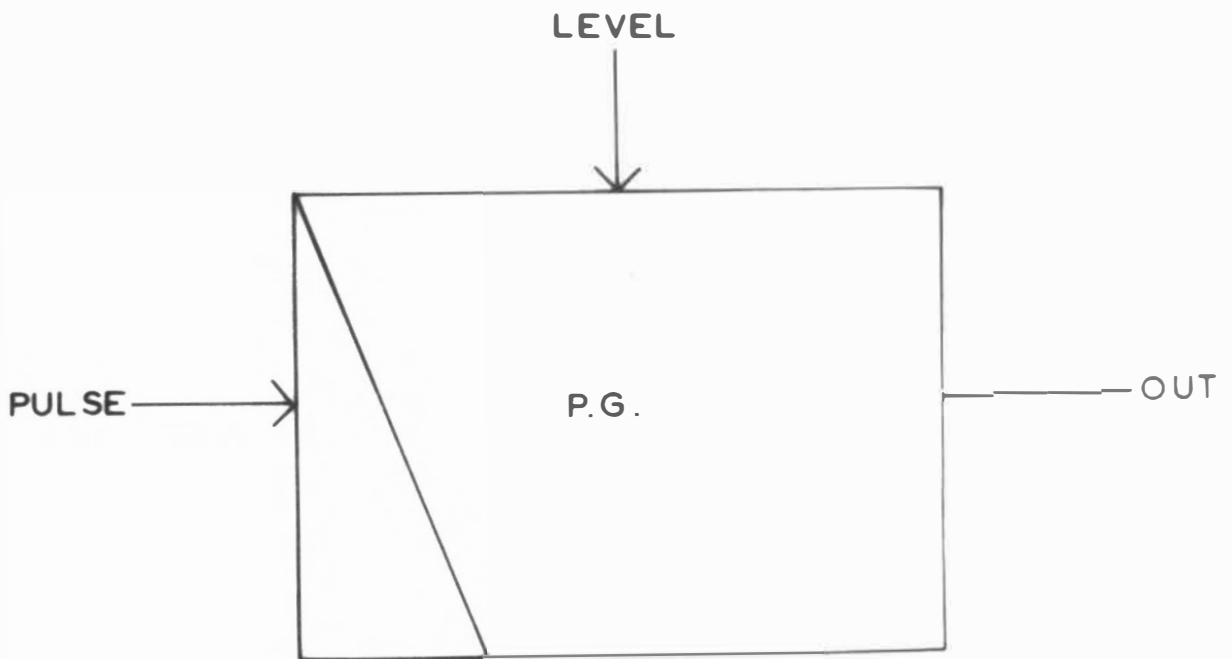
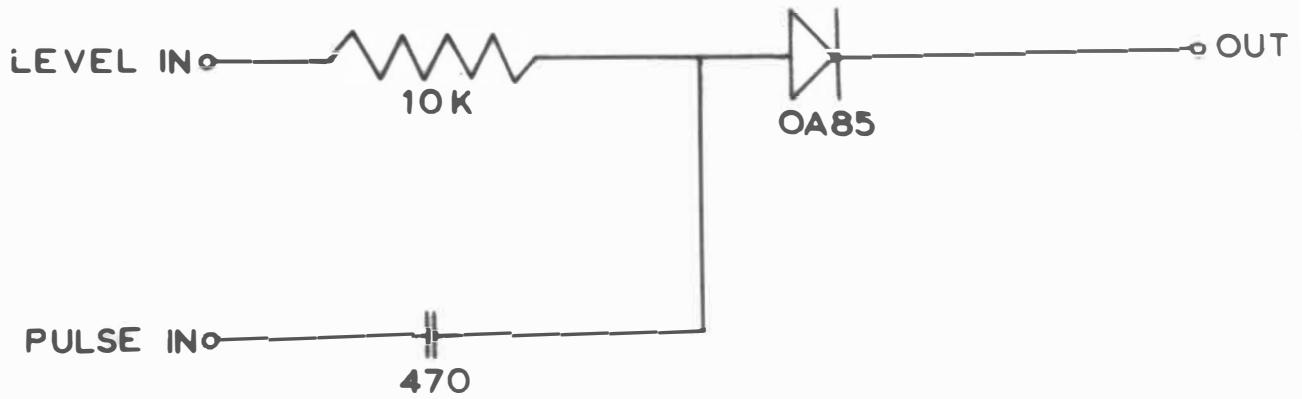


FIGURE B.4. MONOSTABLE MULTIVIBRATOR

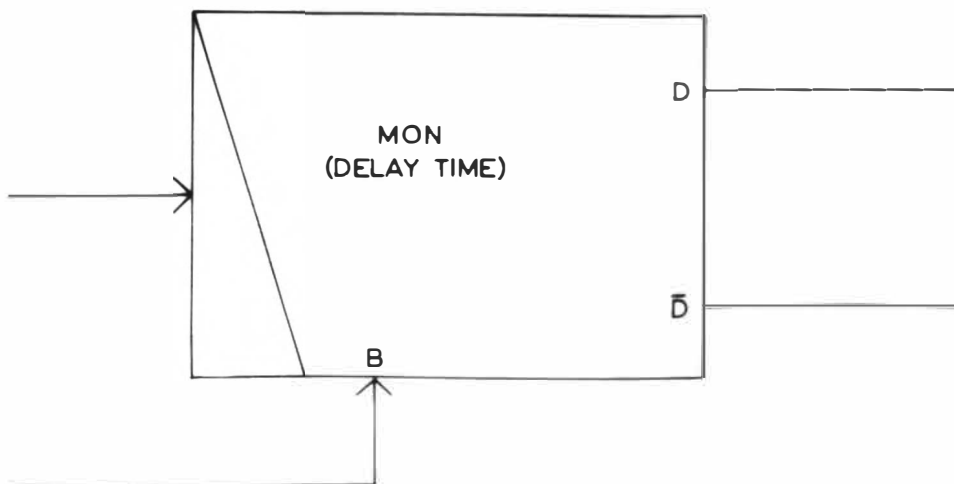
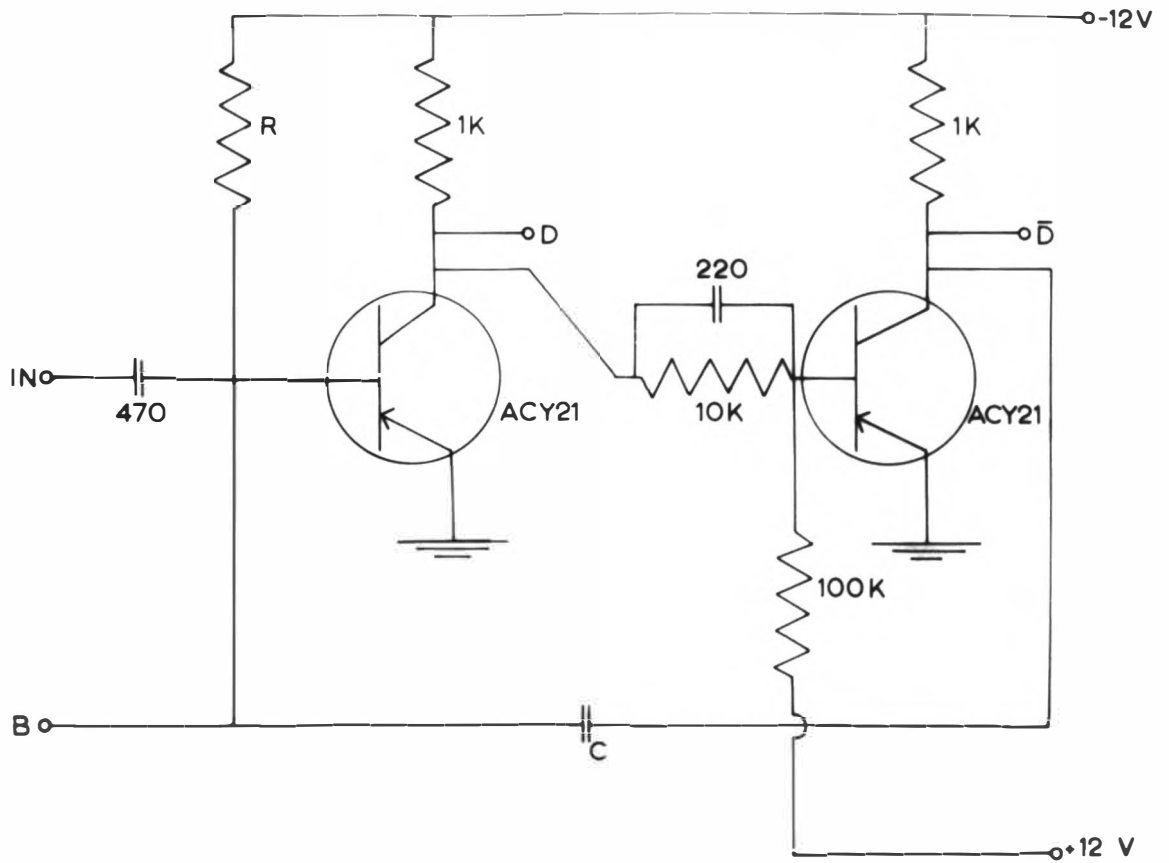


FIGURE B.5. SCHMITT LIMITER

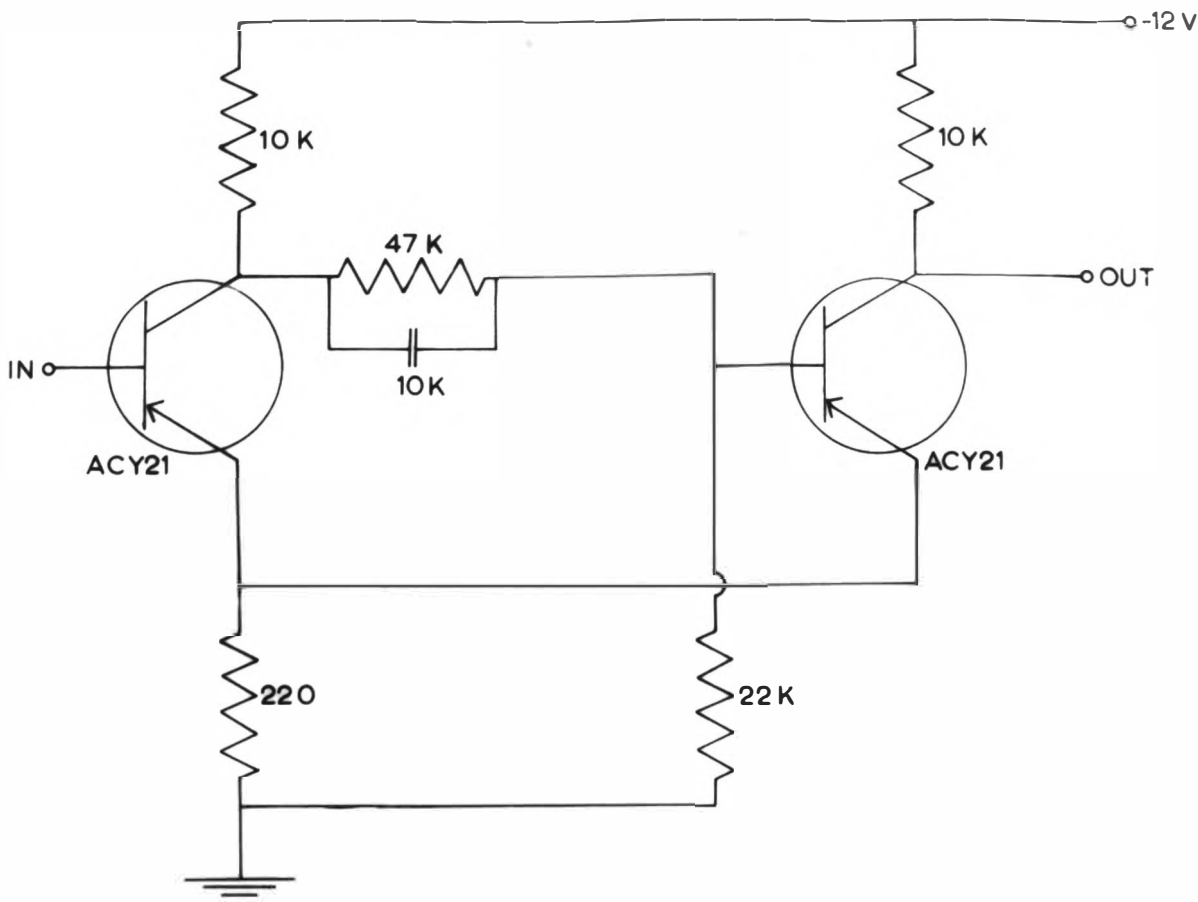


FIGURE B.6. 48 V PULSE AMPLIFIER

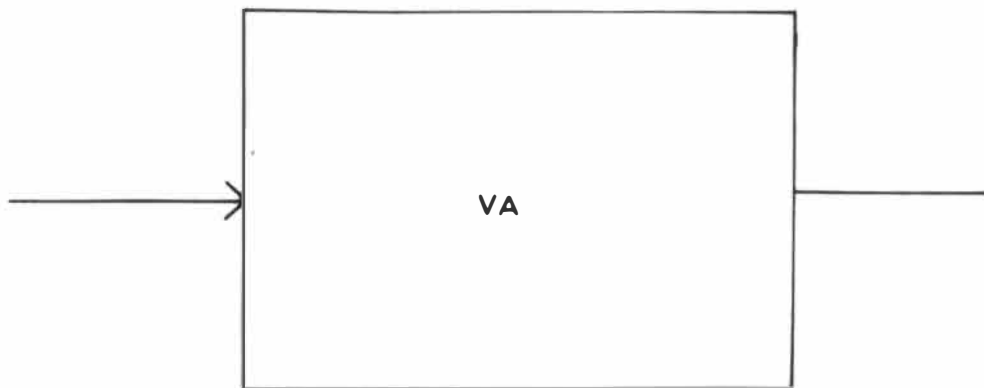
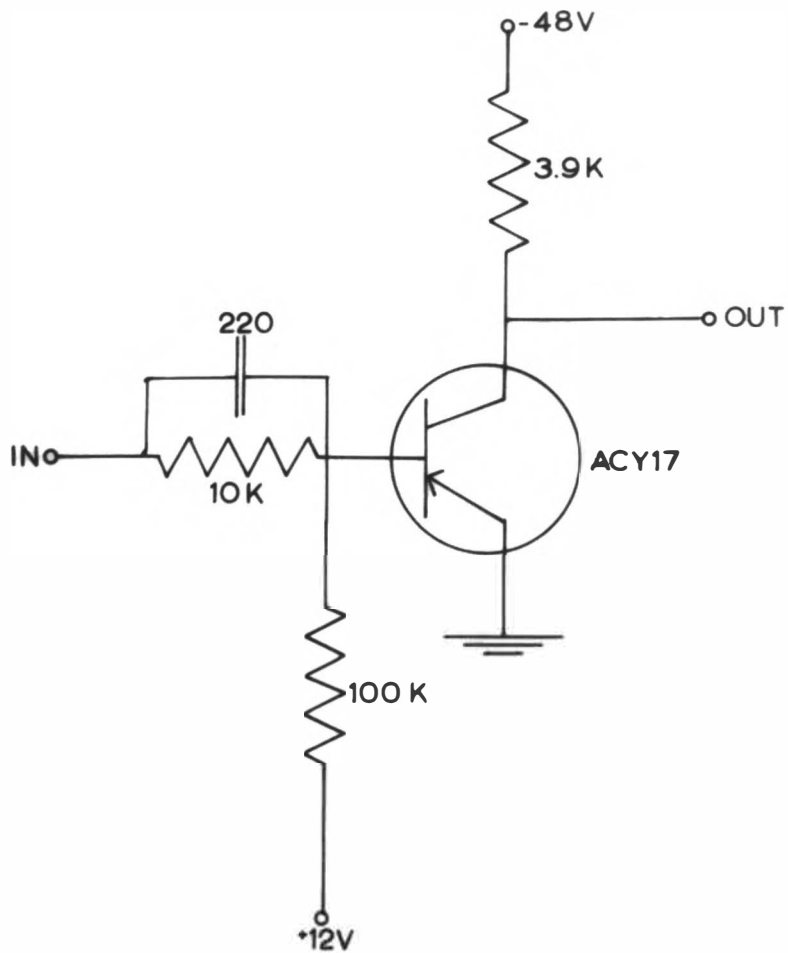


FIGURE B.7. PULSE CONVERTER

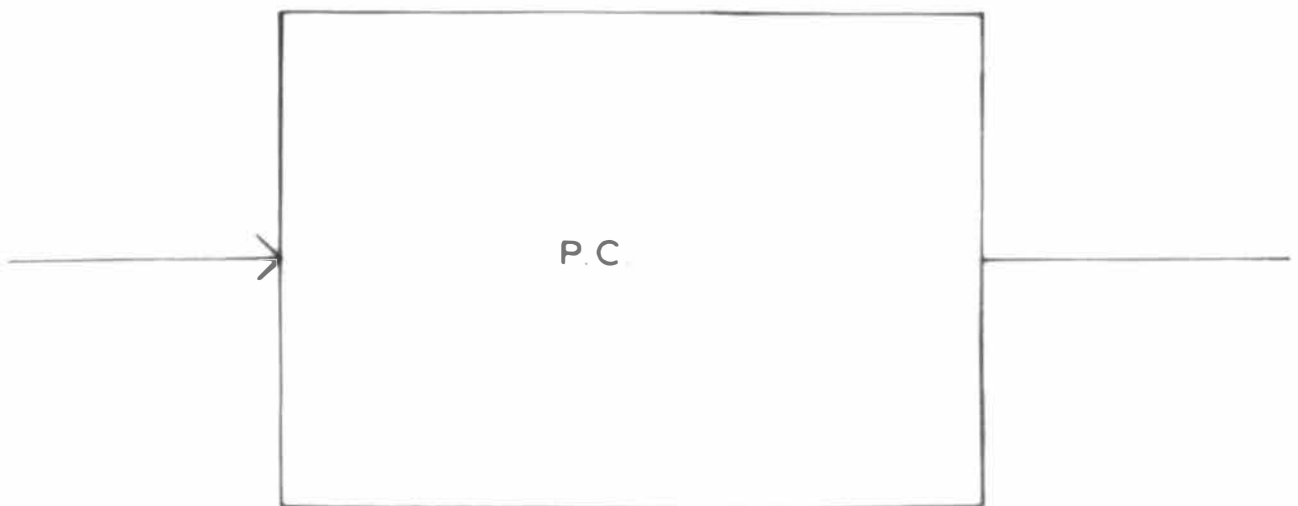
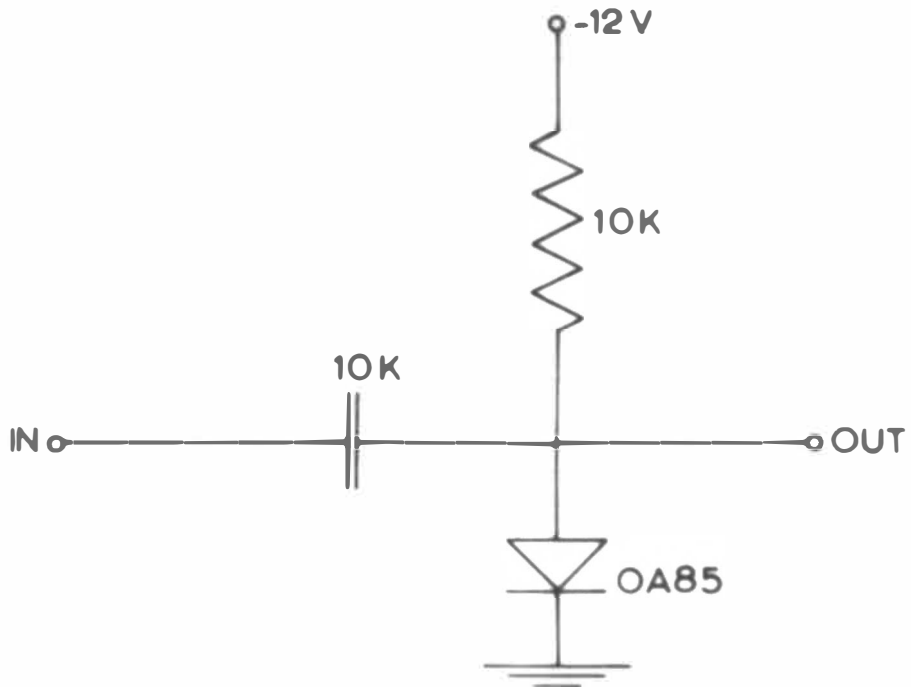


FIGURE B.8. EXCLUSIVE OR CIRCUIT

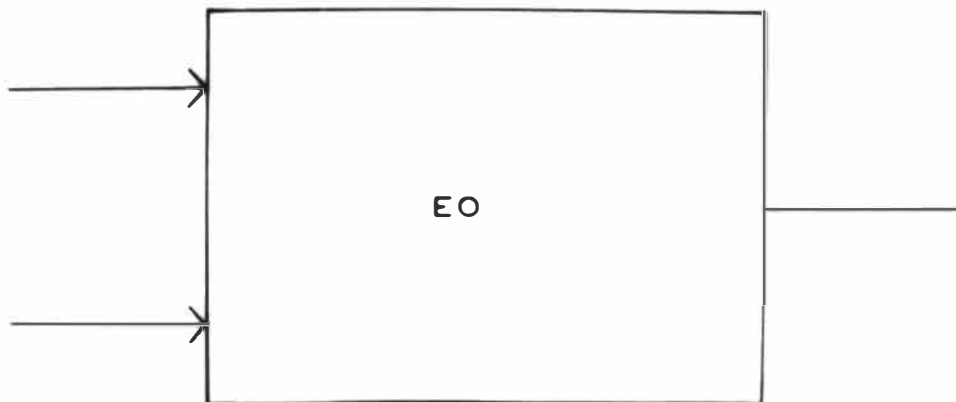
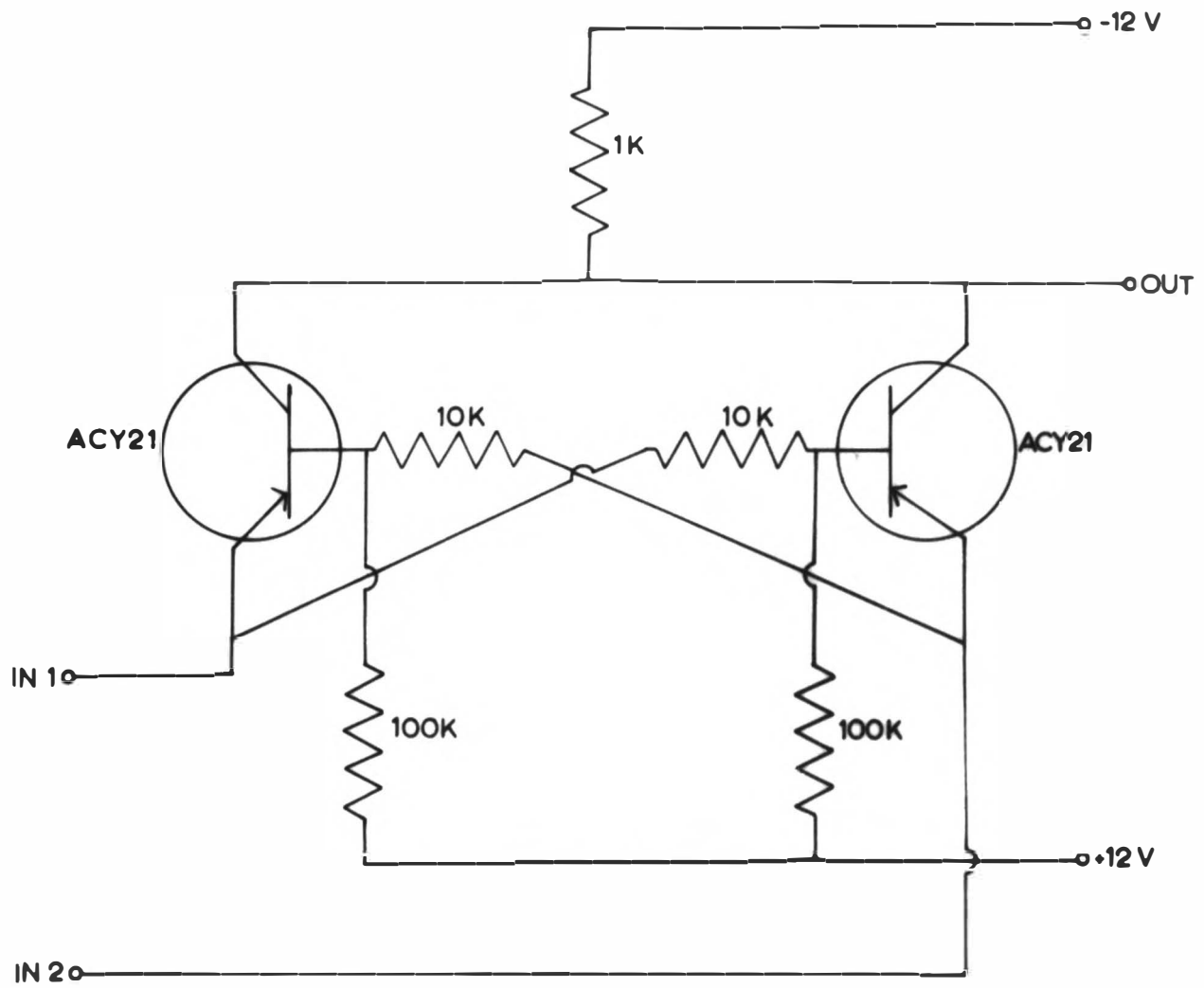


FIGURE B.9. EMITTER FOLLOWER

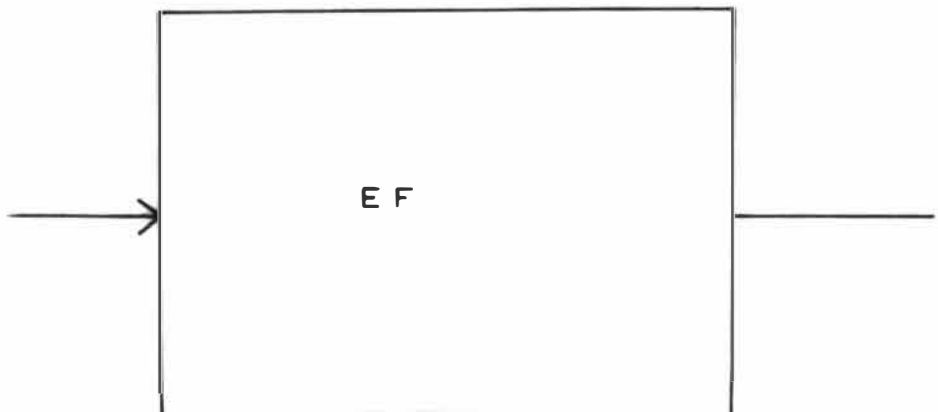
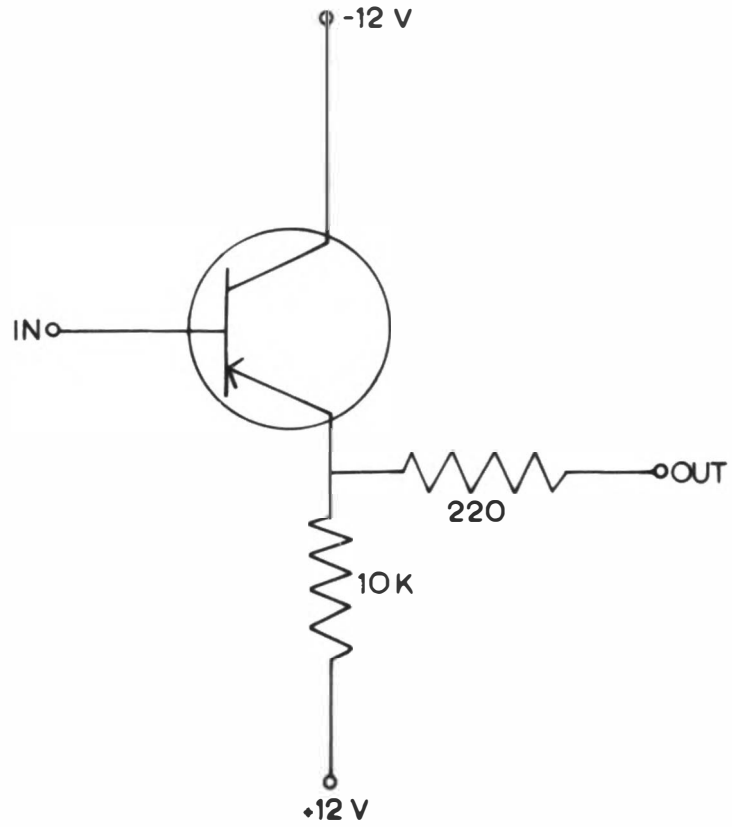


FIGURE B.10. DIODE LIMITER

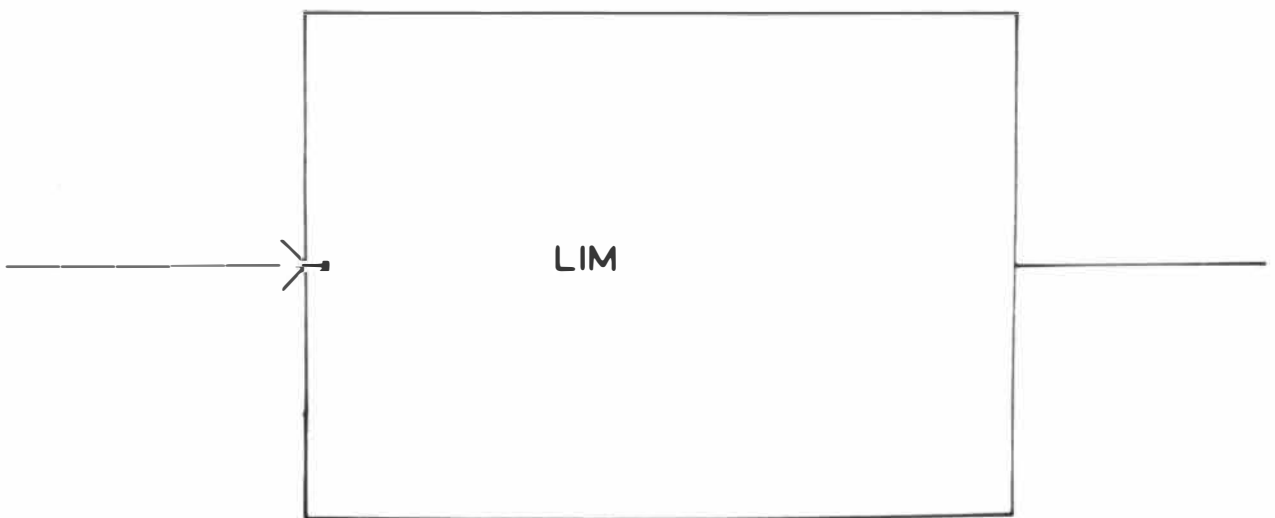
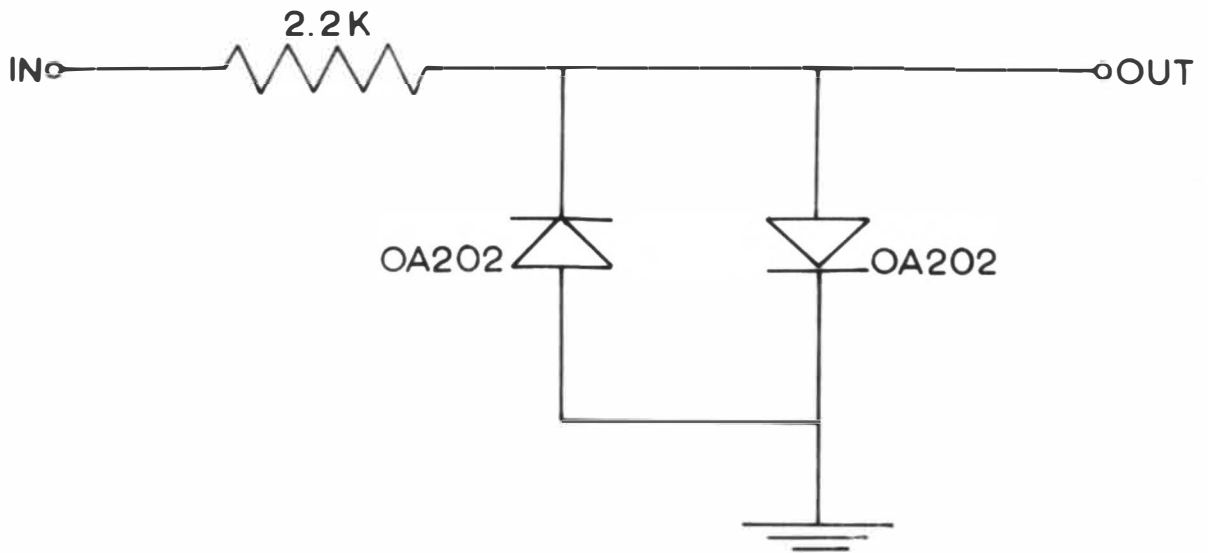


FIGURE B.11. 12 V DIODE CLAMP

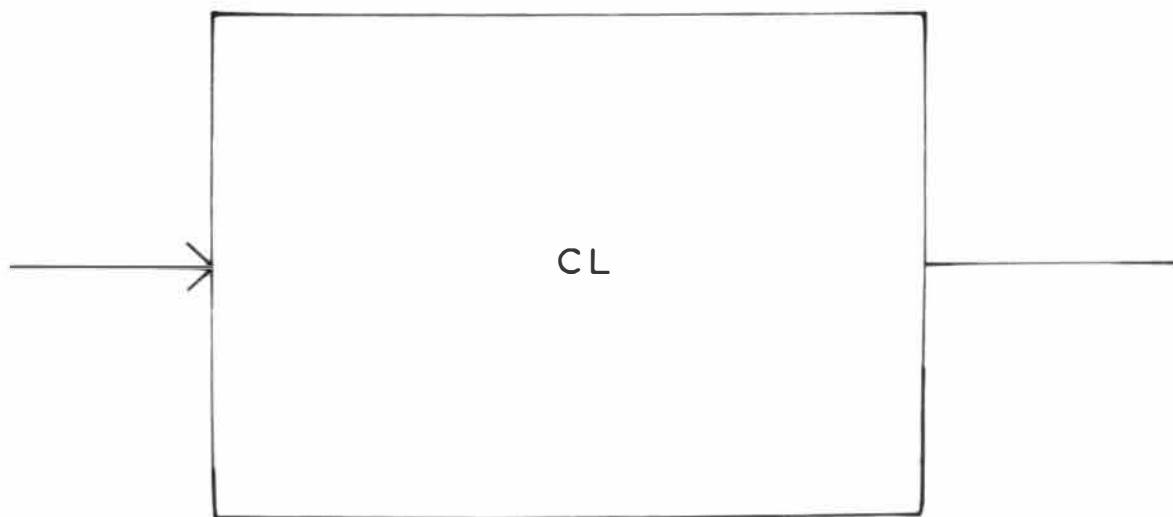
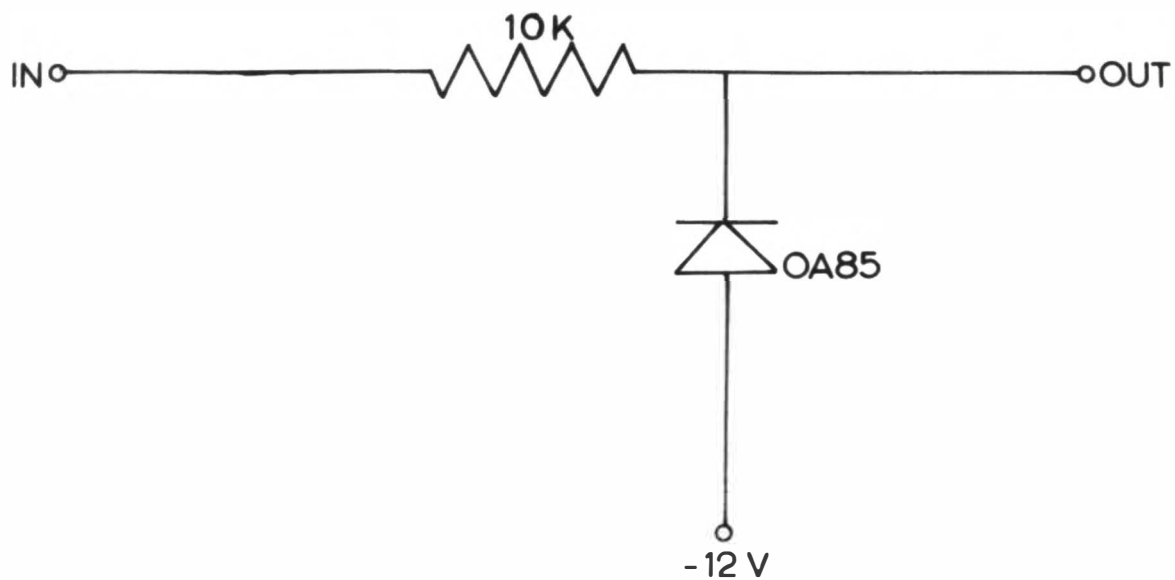


FIGURE B.12. FLIP FLOP (POWER)

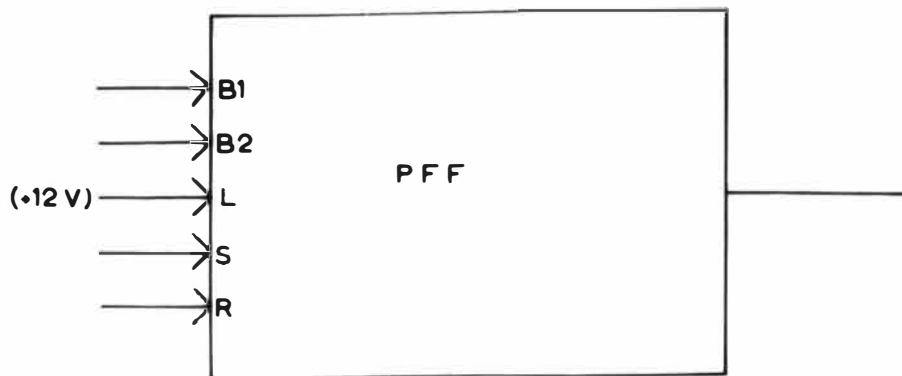
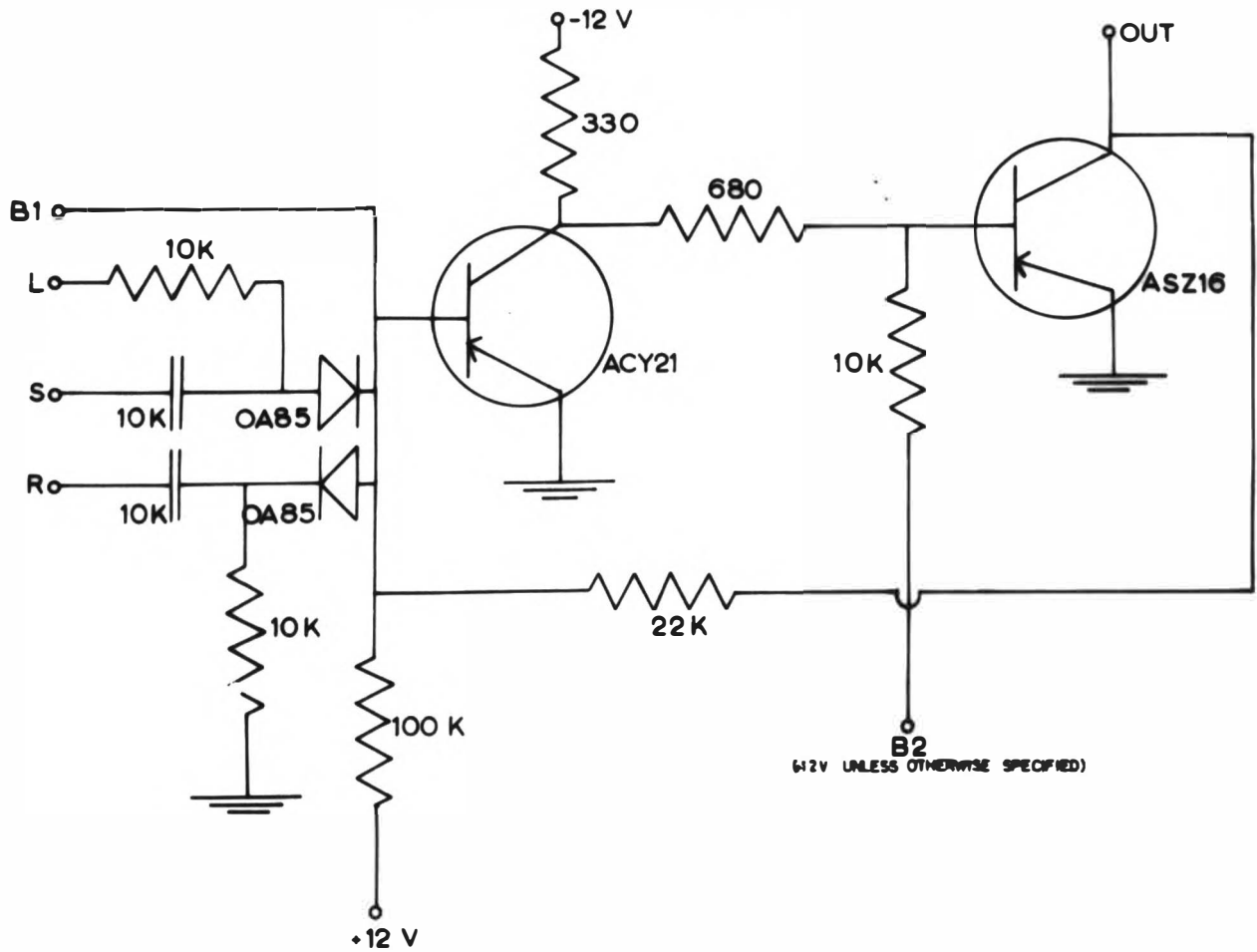


FIGURE B 13. SOLENOID DRIVER.

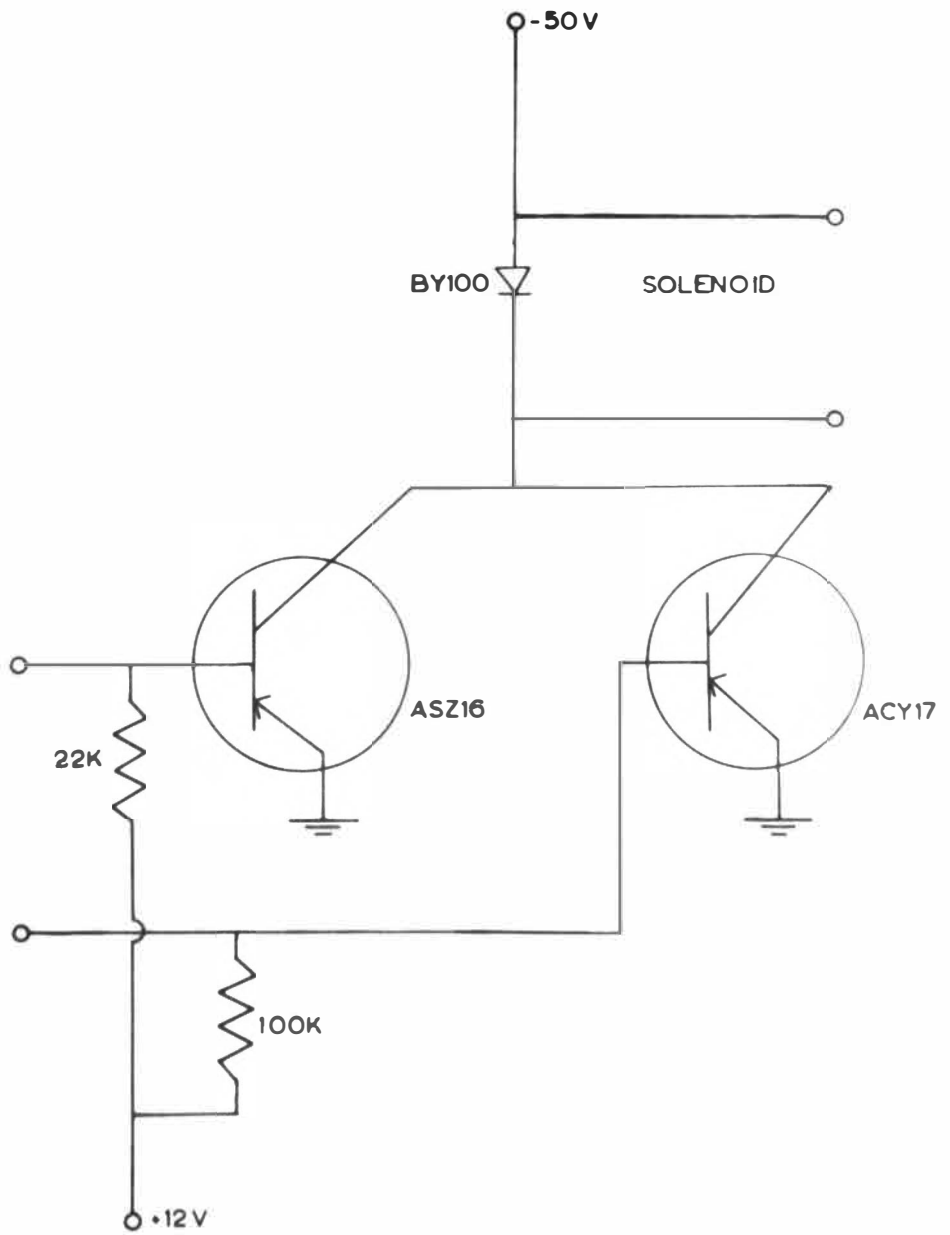


FIGURE C.1. SIGNAL PROCESSING UNIT

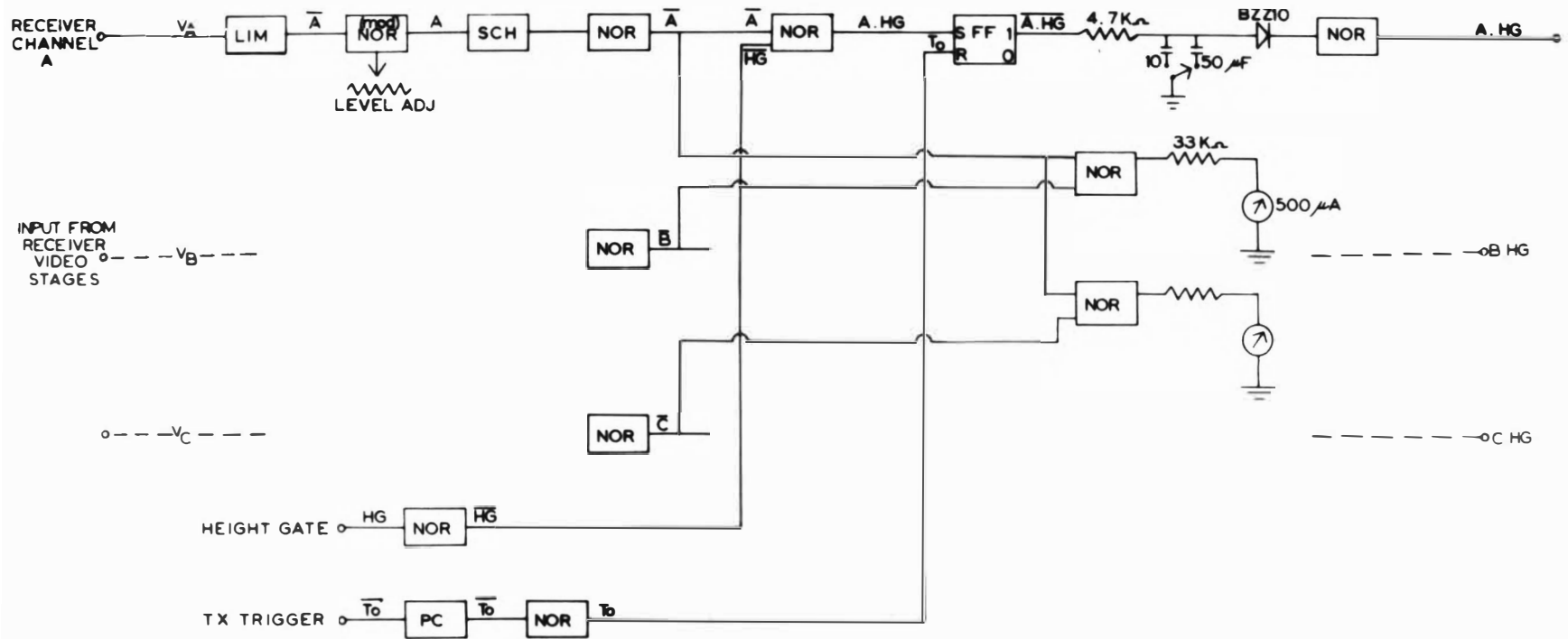


FIGURE D1. PAPER TAPE PUNCH DRIVE UNIT

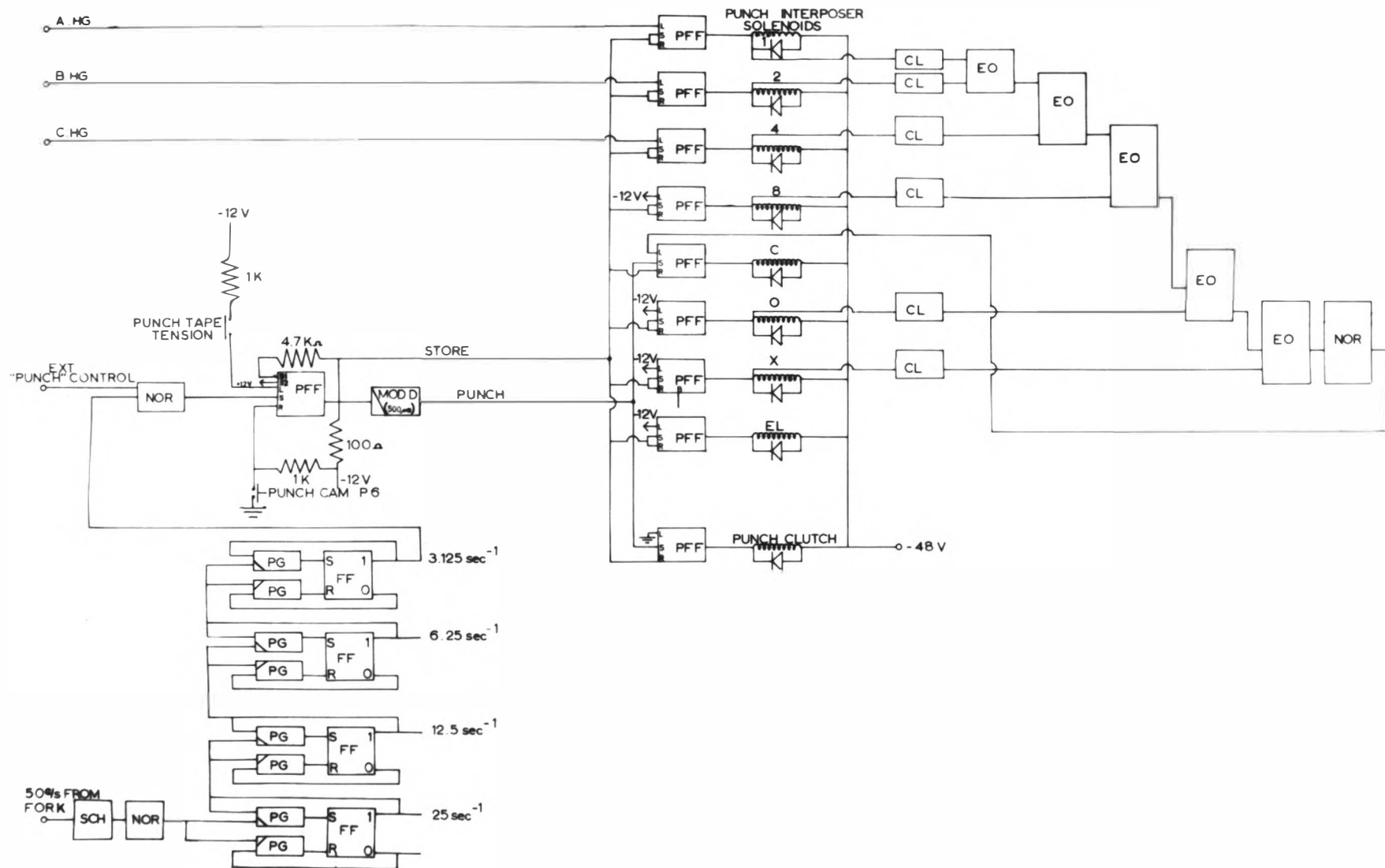


FIGURE E.1. HEIGHT GATE GENERATOR

